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CW Photos by R. Frank

John M. Galvin, senior vice-president of Aetna Life and Casualty and keynote speaker at DataComm 76, described the IBM/Comsat/Aetna satellite system. At the show Memorex introduced an IBM 3270 plug-compatible CRT. Conference coverage continues on Pages 6-7.

DataComm 76 Sees Start Of National Users Group

By Ronald A Frank
Of the CW Staff

NEW ORLEANS – A user organization specifically for those working in the area of data communications held its inaugural meeting at the DataComm 76 conference here last week.

Known as the Association of Data Communications Users (Adcu), the group will emphasize regional activities, according to Fred O'Keefe of Equitable Life Assurance, who will serve as first president of the organization.

Unlike other user groups in the communications field, Adcu will deal strictly with the data area, O'Keefe told about 40 conference attendees at the Adcu meeting.

Any non-vendor organization "using data communications equipment, systems or services" will be eligible for membership at a yearly fee of $80 and will be entitled to one vote. Individuals can join, regardless of whether their employer is a member, at an initial cost of $25; and those nonvendors who cannot qualify for other classes of membership can become fellows for $25.

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IBM Attorney Charges

Much Trial Testimony Needless

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Much of the testimony given by witnesses in the U.S. government's antitrust suit against IBM – perhaps as much as 50% to 75% – has been unnecessary, an IBM attorney implied here last week.

Lawyers for IBM and with the Department of Justice easily could have stipulated (agreed to the truth of) a great deal of the material entered into evidence by the government in its case so far, Thomas D. Barr, lead IBM counsel, told Judge David N. Edelstein at a meeting between the parties and the judge.

At the conference, hastily called in the midst of a recess of the trial to deal with a laundry list of matters, Barr said "and I don't mean 10% or 15%," but more like 50% to 75% of the testimony to date could have been stipulated by the sides.

When both sides in a court case stipulate the facts at hand, the court then accepts them as true and witnesses do not have to be called to testify to the truth of the statements.

Often the parties stipulate to such things as the date of a product announcement, the price of a product or even more difficult questions such as the intent of certain products and practices.

So far in this case, however, the stipulations have been relatively minor and in some instances the parties have not even stipulated the announcement dates of various products, which means considerable time has to be taken to get witnesses to clarify such details.

Barr noted the government has already called 21 witnesses to the stand and that almost 90 are still to come before the government rests its part of the trial (see stories on Pages 3 and 8).

"A large part of this work" could be done by stipulation outside the courtroom, Barr said. While he didn't want to be critical of the government attorneys, he added, he feels the stipulations could be made despite protests from them that the

(Continued on Page 3)

IBM Claims Attachment Duplicates Second 168-3

By Patrick Ward
Of the CW Staff

WHITE PLAINS, N.Y. – IBM's Attached Processor System (APS) serves as an alternative for 370/168-3 users whose only previous growth option was to move to a multiprocessor system.

The APS adds the instruction execution elements of a second 168-3 to the user's system, but at a lower cost than moving to a complete 370/168 multiprocessing system, IBM said.

A 2M-byte 370/168-3 rents for $83,520/mo; a 2M-byte APS rents for $141,520/mo; and a 2M-byte multiprocessor system costs $186,194/mo, IBM said.

An APS-equipped 168 offers computing performance 1.5 to 1.8 times that of a standard Model 168-3, IBM said.

The APS is best suited to shops which tend to be computer-bound rather than I/O-bound, IBM said.

In an APS configuration, the "host" 168-3 CPU handles supervisory software and I/O and the APS takes care of application programs, the company explained.

Like the Model 168-3's instruction processor, the attached unit has an 80 nsec machine instruction cycle and its own high-speed buffer, which helps make data available faster for application processing, the company claimed.

The APS was designed to let the user gain computing power without adding more main memory, disk storage capability or communications channels to his system, IBM said. Later, as those requirements also expand, the user can move to a full multiprocessor system.

Program Support

IBM said system control program support will be provided by a minimal modification to OS/VS2 Release 3.

All I/O operations in an APS are handled by the host Model 168-3 central processing unit, but main memory is shared by both the host and the attached instruction processors – increasing the system's ability to process machine language instructions, IBM said.

Elements of the APS include the IBM 3062 attached processing unit and the 3067-5 power and coolant distribution unit.

Conversion from an installed Model 168-3 to an APS requires modifications to the CPU, its power and coolant unit and the operator's console. The conversion takes about 64 hours, IBM said.

Monthly rental of an APS, including the host 168-3 CPU, will range from $135,620 with 1M bytes of main memory to $178,400 with 8M bytes. Purchase price will range from $5,373,000 to $7,281,700.

Current Model 168-3 users can upgrade to the APS for a monthly rental of $56,990 or purchase the upgrade for $1,748,900.

First customer shipments of the APS, as well as field upgrades from standard systems, are scheduled to begin in June, IBM said.

EFT Seen Threat to White-Collar Jobs

By Toni Wiseman
Of the CW Staff

CAMBRIDGE, Mass. – Neither cash nor checks are about to become obsolete, but the white-collar worker is an increasingly threatened species, according to a report on the sociological and economic impacts of electronic funds transfer (EFT) conducted by Arthur D. Little, Inc. (ADL).

The principal social issues which ADL believes require regulatory action concern freedom of choice and possible misuses of EFT systems (see related story on EFT laws on Page 9).

The potential for invasion of privacy and new types of crime will exist within the increasingly interconnected masses of financial information, the report said.

Delays in error detection and liability (when more parties than the payer and payee are involved) will compound the problems, but not make them insurmountable, the report added.

The greatest impact of EFT systems will be to hasten two trends already under way: the automation of white-collar jobs and the information revolution in handling large amounts of data, the report said.

"EFT will intensify the interdependence between stresses these trends already are causing industry, particularly within the financial community," it said.

The computerized processing of payments (or information about them) will only gradually change the present payment system, according to Martin Ernst, ADL vice-president who directed the National Science Foundation-commissioned study.

"EFT will never replace very many of the 200 billion annual cash transactions and, while it will eventually replace a significant portion of the checks written, it will need to develop much faster to overtake the annual rate of increase in checks," Ernst said.

Slow Development

However, EFT will develop slowly because people are content with using cash and checks, he added.

The traditional cash and check

(Continued on Page 4)

A Matrix to His Method

By Don Leavitt
Of the CW Staff

RENO, Nev. – Faced with responsibility for recommending hardware and software changes at Sierra Pacific Power Co., Vincent P. Cherpeski devised a systematic approach to the evaluation procedure.

In each study he runs, Cherpeski, the technical assistant to the utility's DP manager, sets up a matrix matching products against a list of criteria.

These needs are described in terms that may only apply to his installation and this undoubtedly introduces some subjectivity, Cherpeski said.

In an evaluation of source statement library programs last year, for example, the chief criteria read simply: "Easy to use. Documentation provided is well-written and concise. Programmer reference cards should also be available."

Existence of reference cards can be checked easily enough, but the rest of this specification is – objectively – very imprecise. Yet Cherpeski said he knows what he means by it and, more significantly, how important each of the criteria is to Sierra Pacific.

So he assigns a weighting factor to each, ranging from a score of 10 for features that are most important, to a rating of 1 for those that are "nice to have, but not critical." Then he rates each product on how well it meets the individual criteria.

Here again the procedure has an objective

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CW Special Report on Software Packages follows Page 38.

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Layout/Design — Cynthia L. Kintzer

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9; Telex: 264737. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

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In N.H. Primary Campaign

DP-Generated Lists Get Candidates' Vote

By Ann Dooley
Of the CW Staff

MEREDITH, N.H. – Tomorrow's New Hampshire primary is traditionally one of the most closely watched and therefore one of the most competitive for candidates in the presidential race.

In an attempt to locate and reach more voters than their opponents, several of the candidates are using computer lists of registered voters compiled by a company here called Direct Mail Systems.

Using an IBM 360/50, Direct Mail Systems gets most of its raw data from local voter registration lists from each of the 299 voting precincts in New Hampshire. The data on each voter's name, address, party and telephone number is then keyed into the computer.

"None of this is illegal; it is all public knowledge and no threat to anyone's privacy," Ray Burton, a partner in the firm, said.

There is a person in each precinct to "marry the list," Burton said. This entails matching each spouse with the other and then with their address so duplications won't occur.

Updating Lists

Direct Mail Systems tries to keep the list as up-to-date as possible. After each election, the new voter precinct lists are gone over, changed and updated. The list, which was put together in November 1974, has been updated on an average of every three months, according to Frank Brighton who handles the data processing.

The list was last updated in December of 1975 and will be corrected again after tomorrow's voter registration lists are in. "No list is ever all-inclusive, but clients say ours is the best they can get their hands on," Burton said.

Stewart Lamprey, the founder of the company, became interested in the list after he worked for Richard Nixon in the '60 and '68 New Hampshire primaries. This is the first election during which he is not working for a particular candidate, but rather as a businessman.

Both Ronald Reagan and Gerald Ford have bought Republican mailing lists, and Jimmy Carter and Morris Udall are two of the Democrats who are using the service.

The Direct Mail Systems computer file has mailing labels for 103,757 Republicans, 80,355 Democrats and 116,132 Independents. These figures are lower than the actual number of registered voters since only one mailing label is assigned to each address no matter how many registered voters reside there.

Choice of Lists

The candidates can buy any list they want and can attempt to reach across party lines or try to sway the independent voter by contacting them through mail or telephone.

Both Ford and Reagan used the list for an advertising campaign before Christmas. Reagan's organization has completed a telephone canvass of voters, and Ford's volunteers are completing calls to undecided voters.

Each of the party lists compiled by Direct Mail Systems is broken down by precinct in case a candidate wants to concentrate on voters from a certain area or contact them about a certain issue pertinent to that area.

Plans are being made to compile lists of special interest groups, but so far there has not been enough time in which to do it, Burton said. "It takes an incredible amount of time to compile, let alone update, these lists," Burton said.

Direct Mail Systems has compiled a community leadership list which includes city council members, area leaders and those people judged prominent in community affairs.

Because of the time involved, no one is notified that they are on such a list and most are probably not aware they are included on it since it has not been used by any candidate to date.

EFTS Commission Gets to Work, But Senate Balks at Nomination

WASHINGTON, D.C. – The merry-go-round continues for the moment, but it appears the long-stalled National Commission on Electronic Fund Transfers [CW, Jan. 12] is finally getting down to work.

As expected by most observers, Jack Benton of TRW Systems has been nominated as the commission's staff director. But Senate action on his confirmation has been delayed, which was not expected by some.

Meanwhile the commission itself, established to study electronic funds transfer systems (EFTS) met for the first time early this month.

The White House submitted Benton's name, but the Senate refused to act on the nomination from that source. In a letter, Sen. William Proxmire (D-Wis.) noted the law establishing the commission specified the staff job was to be a nonpolitical appointment made by the commission and not by President Ford.

Once the Senate made its views clear, the nomination was put forward by commission chairman William B. Widnall and the Senate will begin confirmation hearings on Thursday, Feb. 26.

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IBM Suit 'One of Most Important Ever Filed': Clark

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – "We need a broad range of initiative in the computer industry or we will have less effective hardware, software and services," according to the man who filed the government's antitrust action against IBM over seven years ago.

"Competition is an important stimulant to creativity," Ramsey Clark said in explaining some of the reasons that led the government to file the suit on Jan. 17, 1969 – his last working day as U.S. Attorney General and the last day of the Johnson administration.

"The IBM suit is one of the most important antitrust cases ever filed," less because of its impact on the computer industry than because of the impact computers have on every segment of American life, Clark said here in a recent interview.

Because of this wide range of computer applications, "the public has a great stake" in the outcome of the trial, he added.

At the same time, Clark indicated he had been concerned "about what seemed to be awfully long delays" in bringing the suit to trial, particularly in light of the "enormous amount of work by a number of key people" that had been done before the case was filed.

For a time under the Nixon administration, the case "didn't seem to be moving," he said.

The groundwork for the case had been completed and the issues "thoroughly studied" on both a factual and legal level before the case was filed, Clark said, indicating the focus and theories for the case had been laid down almost 18 months before the filing.

Today, he said, it is "hard to be sure" what the government's theory in the case is; it has changed somewhat from the early days and presently is taking a weaker approach than originally proposed, he said.

Importance of Case

The importance of this case does not rely on the effects of a dominant company on other manufacturers in the business, Clark said, or even on the effect of a dominant supplier on users of computer equipment, even though the effect on them is a more important consideration than the narrow issue of the effect on other manufacturers.

What is really important, he said, is that so much activity in the U.S. today – not only in the business sphere, but also in the social arena – "more and more depends on creative computer technology.

"To have a monopoly in this area could be stifling" to future growth of such applications and uses since there would "not be as much incentive or flexibility" in an industry dominated by one firm as there would be in more competitive areas, he said.

"With a single or dominant supplier of a basic item like this," there is a possibility of "enormous damage" to society because there is less incentive for research and development in monopolized industries, Clark said.

"That would be a terrible price to pay," he added.

At the time the case was filed, Clark said, the government estimated IBM had somewhat more than 60% of the marketplace, while the nearest competitor had around 6%.

Furthermore, the failure – since then – of firms like RCA, GE and Xerox to compete in the business "compels study," Clark said: "If they can't compete, something's wrong."

The IBM case illustrates some problems with the current antitrust laws, Clark indicated, stating that those laws are "not sufficient as enforced."

There is "enormous concentration" in American business today, Clark said, stating that he was "very strong on deconcentration" for industry that was going to remain private.

The American public seems less interested in antitrust and issues of concentration than in the past because most Americans have grown up with big business as a dominant force in their lives, he said.

Much U.S. Testimony Needless, IBM Says

(Continued from Page 1)

stipulations were difficult.

As an example, he noted IBM sent a proposed stipulation on the 360/67 to the government attorneys over six months ago, but has yet to "have one word back" on the subject.

The only government witness who will be dealing with the 360/67, Barr said, will be on the stand this week, and the IBM attorney indicated there will have to be a great deal of testimony from him on issues that could have been easily stipulated, thereby bogging down the court with details on which the parties do not disagree.

Edelstein indicated he was "frustrated" with the lack of stipulations between the two sides, stating he had "never been so disappointed" by such failure to agree.

The long pretrial process should have helped the parties arrive at these agreements, he said, but noted the results "have been quite to the contrary."

At the same time, the judge stated IBM was challenging the special masters' reports on a number of documents IBM claimed were privileged – a claim overruled largely by the masters.

Over 26,000 documents have been acted on by 12 special masters, – judges assigned to the task of reviewing them – and IBM is challenging the reports of all 12. The masters have ruled against IBM's claims of privilege for about 80% of these documents.

The issue is complicated, Barr contended, because many of the documents have no bearing on the government's case, but he would have to turn them over to the government attorneys for them to realize that.

If he did that, Barr said, he would be giving up IBM's claim of privilege and the documents might later be used in other actions.

Raymond Carlson, the lead government attorney, contended IBM was claiming too many privileged documents and he had never seen such claims of privilege in the past.

The judge indicated there was little he could do to help speed up the stipulation process, but urged the parties to do all they could to reach agreement on such items.

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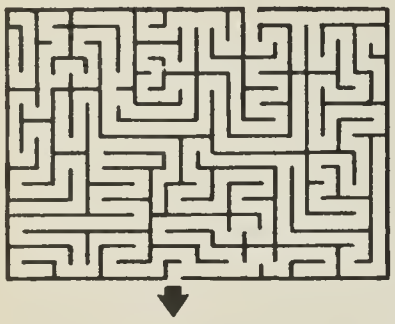

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Matrix Eases Software Package Choice

(Continued from Page 1)

form, with numeric values making up the rating scale. To the surprise of some, however, he reverses the logic of the weighting factors in setting up the product ratings: 1 is the highest, 5 is a fair rating and 10 is used if the facility is nonexistent.

If there is no difference in the products, they are assigned the same rating, Cherpeski noted. In any case, the final raw score for each product is the total of each criteria's weight times the product's score on that item.

The lowest raw score thus calculated "wins" the evaluation, although Cherpeski goes one step further to show his management how well the competing packages compare with each other. He normalizes the raw scores, assigning the lowest one actually accumulated a value of 1.0.

The net effect of this entire procedure is that important features do carry extra weight. A vendor's ability to satisfy these critical needs can make or break his product's chances.

In the source statement library program "competition," for example, four products were in the running: Splis from NCI, Maxi-Libe from Maxima Systems Group, The Librarian from Applied Data Research and Panvalet from Pansophic Systems.

The "easy-to-use" criteria carried a weight of 10. According to Cherpeski, Maxi-Libe earned a rating of 1 and therefore a weighted score of 10 on this item. The others had slightly poorer ratings and therefore somewhat higher weighted scores.

Further down the list, Cherpeski had another specification, and this was where Splis, for one, came a cropper. The requirement called for "training provided by vendor in use of product to minimize conversion problems and train users." Fairly important, this had a weight of 7.

When he did his study, Cherpeski considered this nonexistent for Splis and gave it a 10 or a weighted score of 70 on this item. The others garnered ratings of 1 or 2 and weighted raw scores of only 7 or 14 on the same item.

Ultimately, the selection matrix carried 13 criteria with weights adding up to 81. Presumably a perfect product would have scored 1 on each and had, therefore, a total weighted raw score of 81.

In fact, the best raw score was a 125 earned by Maxi-Libe, and the others went up from there to a high of 305, or a 2.44 normalized score.

Now that a year has passed, Cherpeski said he thinks some of the weighting factors might have been changed if he'd actually seen the packages in operation, "but the overall decision [in favor of Maxi-Libe] would have come out the same."

In any case, he said he is satisfied with the approach he devised. "A matrix is a good way to organize your thoughts and to make sure you cover everything," he said in conclusion.

EFT Seen White-Collar Threat

(Continued from Page 1)

payment system now handles about 250 billion transactions per year at a cost to society of some $14 billion, or about 1% of the gross national product, the report said.

Broken down, there are some 200 billion cash transactions annually at a cost of about 1.5 cents per transaction. Check transactions – there were 28 billion written in 1974 – cost more than 30 cents each.

Finally, credit card transactions cost more than 50 cents each for the some 5 billion made each year, the report said.

The present payment system is functioning well, according to ADL. Major changes will result from competition within the depository financial industry and not from dissatisfaction or failures.

The Federal government is helping to bring about changes by initiating programs such as the direct deposit of federal payrolls and Social Security payments, the report said.

Progress in EFT systems does not require further technological developments, the study found; rather it depends on how banks, government and business cooperate in resolving some very basic issues. These include ownership, pricing, standards for and access to system components.

ADL predicted that by 1980 EFT may handle 17% of payments now made by check, but that, even at its peak, EFT will never handle more than 70%.

"The acceptance and cooperation of individuals are essential to the successful functioning of EFT systems," the report stated. "People will move slowly in accepting EFT unless they need to use it and don't feel threatened by it. An understanding of EFT, its convenience and a share in any cost savings will speed up acceptance," it added.

Sociological Issues

Sociologically, the main issues in EFT are crime and unemployment.

Fraud, misuse of lost or stolen credit or debit cards and the increased vulnerability to invasion of financial privacy are a few of the areas of individual concern EFT will occasion, the report said.

In addition, in large financial centers, there may be a gradual shift in job opportunities from the relatively unskilled to more highly skilled workers, the report said.

In terms of individual life-styles, ADL found that "the family authority structure may be altered by what amounts to a decrease in parental control because parental knowledge of expenditures by younger members will be delayed."

DPMA Urges Caution on Privacy

PARK RIDGE, Ill. – While it says it supports every individual's right to privacy, the Data Processing Management Association (DPMA) has urged DPers to scrutinize any law that sets information processing standards for the private sector.

In a position statement for its 23,000 members, the DPMA called "omnibus" privacy legislation covering the private sector "prohibitively expensive and unwieldy" and urged that enactment of such law be delayed until the Federal Privacy Protection Study Commission has announced its findings.

DPMA would "support legislation to protect individual privacy from invasion or misuse when such legislation is proved necessary and economically feasible in specific areas of information," the statement said.

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Satellites to Allow Integration of User Needs: Galvin

By E. Drake Lundell Jr.
Of the CW Staff

NEW ORLEANS – Satellite communications will allow users to integrate all of their communications needs – digital, voice and image – into a unified system, John M. Galvin said at DataComm 76 here last week.

Galvin, senior vice-president of the Diversified Business Division of Aetna Life and Casualty, predicted the original offerings of satellite business systems will be aimed at large users with a diverse geographic base.

Aetna is a partner in the Satellite Business Systems (SBS) venture with IBM and Comsat General.

There will be no commingling of services over that satellite system, Galvin promised, stating IBM would not offer bundled data processing and communications services over the SBS system.

While satellite communication links will permit the unification of a firm's communications needs, they will also permit – for the first time – economic distributed processing over a wide geographic base, Galvin said.

To date such distributed processing has been held back by the costs of terrestrial links, he said, noting that distance would not be as dominant a factor in the pricing of satellite services as it is in terrestrial services.

In addition to overcoming the geographic limitations, the satellite system would also not be as concerned with the number of points on a network, nor would the pricing be dependent on the number of points, he indicated.

The satellite services will be fully compatible with the present phone interfaces, he said, or with standard DP interfaces depending on the need of the using companies.

Because of all this, the "system can be used to change the structure of businesses," he said, by allowing the first really economical distribution of processing functions.

CW at DataComm

Terminals Ease Tedious Tasks, Bring 'Power to the People'

By Ronald A. Frank
Of the CW Staff

NEW ORLEANS – Terminal-based systems can help take the uninteresting tasks out of many jobs. This was the concensus of panel members at a DataComm 76 session here last week on the role of terminals in bringing DP power closer to the users of a system.

The terminal serves to bring the power of the CPU closer to the people who are originating the data and, as a result, the information has a tendency to become more accurate, according to Dave Blackwell of Massachusetts Mutual Life Insurance Co.

This is "certainly bringing power to the people," he said.

The life insurance company has one terminal for every five employees, but they are not classified as terminal operators. Instead, each person is encouraged to look upon his involvement with the terminal as an enhancement of his regular job functions.

The people typically batch several jobs that require terminal use together and, in this way, are not tied to a tube all day long, he said.

Problems Do Arise

As more employees interact with terminals for their daily job functions, some problems do arise. One of these is the question of how accurately the accessed information is interpreted by those receiving the information.

Thus far it has been difficult to measure this, except when problems arise. Data can be interpreted incorrectly without causing detectable errors in some cases, Blackwell indicated.

Terminals are best suited to access data straight from a CPU, the data then can be manipulated at an intelligent terminal. The use of mainframes for time-sharing applications is really not a good use of resources, he said.

CW Photo by R. Frank

Larry English

This concept of remote processing was also favored by Larry English, assistant vice-president of First National City Bank, who said terminals tied to remote minis can use the minis to do their processing.

"You don't need to be on-line to the mainframe at all times," he said.

In today's systems in banking, information needed daily is loaded onto remote dedicated minis which support locally attached terminals. The next step will be to take the information from the CPU directly into microprocessors which reside in intelligent terminals, he predicted.

As these remote inputs are refined, the goal should be to transmit error-free information to "downstream systems" at the central DP sites.

As "form-filling" tasks make more use of terminal input, clerical jobs will become more interesting and employees will find they are getting increasingly responsible positions, English said.

As a result, employers will get more productivity out of people that now shuffle paper, he concluded.

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'Full-Function Replacement'

Memorex Unveils 3277-Compatible CRT

By Ronald A. Frank
Of the CW Staff

NEW ORLEANS – Memorex Corp. introduced a plug-compatible terminal for the IBM 3277-2 at the DataComm 76 conference here last week.

The CRT operates wtih IBM 3271 or 3791 controllers and is available with an Ebcdic typewriter or operator console keyboard.

The Memorex 1377 terminal operates with the IBM 360, 370 and 3790 systems and was described as a "full-function" replacement by the company.

The terminal costs $130/mo on a one-year lease or $110/mo on a two-year lease with a purchase price of $3,800. This compares with $4,825 and $156/mo for the comparable IBM terminals, a Memorex spokesman said.

Carterfone Communications Corp. introduced four terminal products for end users, previously available only from OEM suppliers. The units include the LA 36 data terminal from Digital Equipment Corp., which Carterfone priced at $1,850 or $79/mo on a one-year lease.

Other units include the Lear-Siegler ADM-3 CRT, which costs $1,145, and the Spintronic teleprinter for $4,200.

Also introduced was the S15 data terminal, described as an IBM 2741 replacement unit, which is available on a two-year lease for $69/mo.

The four units are available on a nationwide basis with maintenance, a Carterfone spokesman said.

Western Union Data Services Co. added a magnetic send/receive (MSR) cassette buffer to its earlier Video 100 CRT. The cassette unit adds a batch capability to the CRT and can transmit data at speeds up to 120 char./sec.

The video 100MSR terminal configuration is available at $141/mo on a one-year lease or $164 on a 90-day lease, a spokesman said.

Cooke Engineering Co. showed its TC-100 test set for use in communications technical control systems. The character-sensitive unit is designed to test circuits, modems, terminals and CPU ports in a network and costs about $3,500 depending on options, the firm said.

Cooke also introduced a modem substitution switch unit that can provide remote switching to substitute a spare modem on any of up to 64 lines.

A switch configuration for eight modems with connectors costs about $1,550, the company said.

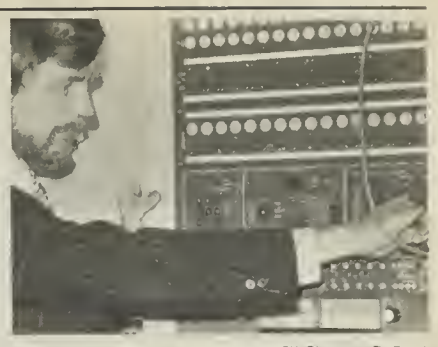
AT&T demonstrated its synchronous version of the Dataspeed 40 CRT in a "minicluster" configuration. The cluster was polled from an IBM 370/168 at a Bell site in New Jersey using IBM's IMS software; the 168 was running under the VS2 operating system, an AT&T spokesman said.

Telenet Communications Corp. demonstrated its packet-switched network for the first time. Using a Texas Instruments Silent 700 teleprinter and AT&T Dataphone Digital Service lines, Telenet accessed scientific time-sharing systems in Washington, D.C.; the Data Resources, Inc. econometric data base running on a Burroughs B7700 in Boston; and the Dartmouth time-sharing system in New Hampshire.

Telenet announced two additions to its service at the show. The firm will add 10 cities to its network in May – Seattle and Portland, Wash., Palo Alto and Anaheim, Calif., Phoenix, Ariz., Milwaukee, Wis., Denver, Colo., Cincinnati, Ohio, Miami, Fla., and Baltimore, Md.

In April public dial-up ports will become available for 1,200 bit/sec users in selected cities, a spokesman said.

CW at DataComm



CW Photo by R. Frank

Cooke Engineering Co.'s TC-100, shown at last week's DataComm exhibit, was designed for technical control centers.

1,100 Attend

NEW ORLEANS – About 1,100 users attended the DataComm 76 conference here last week.

The exhibit included 45 firms who displayed their products and services in 110 booths.

The DataComm 77 conference has been set for March 9-11 next year in Washington, D.C.

User Group Holds Inaugural Meeting

(Continued from Page 1)

Interchange of information between members will be encouraged on a regional level and special interest groups are planned in such areas as terminals, transmission services, modems and front ends. The group will not participate in regulatory proceedings, but members may be advised of important tariff changes.

A representative of the International Data Communications Manufacturers Association suggested Adcu establish a liaison committee to exchange information with his group.

In addition to O'Keefe, the Adcu executive board includes Gordon Lew of American Airlines, first vice-president; Robert Kaufman of Damon Corp., second vice-president; Harvey Hershkowitz of Chase Manhattan Bank, treasurer; and Richard Miller of Eastman Kodak Co., secretary.

Information about Adcu is available from O'Keefe at Equitable Life Assurance, Box 580 GPO, New York, N.Y. 10001.

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After 21 Witnesses, U.S. vs. IBM Trial Continues to Drag

By Edith Holmes
Of the CW Staff

NEW YORK – Twenty-one witnesses have appeared on the U.S. government's behalf in the market definition portion of its antitrust case against IBM here after 87 days of trial.

These witnesses, the parties and the judge had generated 12,697 pages of transcript when the proceedings recessed for two weeks on Feb. 5 to permit the completion of document discovery by Xerox Corp.

Six Xerox employees were recently called by the Department of Justice to detail the reasons why that company decided to leave the computer industry last July, and they will probably take their turns on the stand sometime this spring.

When the trial was suspended for the holidays on Dec. 18, the court had been presented with 356 documents by the government; another 240 documents were entered into evidence by IBM. As of Feb. 3, the docket sheet for the case included 3,048 filings, including some hefty reports prepared by judges who are ruling on the confidentiality of certain IBM documents, the government hopes to enter into evidence at some point in the trial.

Where is U.S. vs. IBM headed at this point – particularly as the Department of Justice presents its case to Judge David N. Edelstein, who is hearing the antitrust action alone?

Assuming the government's witness list will remain at about 107 people, then there are 88 or so remaining to be called to court. And if the pace of the trial stays the same, then those 88 will require 365 more trial days.

Because the court usually sits four days a week and has conducted the trial 23 weeks in the last nine months, the government's main case could go on for another three years, perhaps until spring 1979.

All of this is speculation, and not particularly hopeful speculation at that. Yet the anticipation of some 91 more weeks of trial before IBM counsel even begins to present the corporation's defense might also be termed "optimistic" if the time required to complete the testimony of the last four witnesses is taken as a basis for determing the pace of the trial.

That the last four witnesses to appear in court – Arthur D. Beard, John J. Hangen, Edwin S. McCollister and Joseph William Rooney – have each been on the stand for two trial weeks is an indication the proceedings are slowing down. If the "one-witness-a-week" rule evolves into "one-witness-every-two-weeks," the time needed by the government could double. That would bring the trial up to spring 1982.

These projections are, of course, based on the assumptions that the government's witness list won't undergo any drastic cuts, that the court will continue to sit four days a week for four to five hours a day and that witnesses will consume an average of at least one trial week on the stand.

The government maintains the market definition portion of its case has necessitated examining those called to the stand about every thing they know regarding the computer industry. Other aspects of the case, such as the next scheduled section on IBM's marketplace conduct – beginning with bundling – should see witnesses moving on and off the stand more rapidly, attorneys with the Department of Justice have contended.

Government lawyers have also asserted IBM regularly takes inordinate lengths of time on cross-examination. The accompanying chart indicates IBM has had 10 of the 21 witnesses appearing for the Department of Justice on the stand longer than the government has in examina-

(Continued on Page 10)

And in This Corner . . .

CW Photos by E. Holmes

THE GOVERNMENT. . .Raymond M. Carlson and Joseph H. Widmar (left to right) head the Department of Justice team given the responsibility for bringing IBM to trial under Section Two of the Sherman Antitrust Act on charges of monopolizing commerce in the general-purpose computer system and peripheral marketplaces of the U.S.

Their team consists of 21 full-time attorneys; 25

(Continued on Page 10)

THE DEFENSE. . .Thomas D. Barr (second from right) of New York's Cravath, Swaine & Moore is in charge of the attorneys from the law firm defending IBM in this antitrust action.

He and his partners (from left to right) Robert F. Mullen, 33, Paul Michael Dodyk, 38, and David Boies, 34, head a group of 15 full-time lawyers at any given point in time and are responsible for the actual

(Continued on Page 10)

Name of Witness	Time Government Estimated Witness Would be on the Stand for Direct Questioning (days)	Total time on the Stand (days)	Time taken by Government (approximate to 1/4 day)	Time taken by IBM (approximate) to 1/4 day)	Dates on Stand
Dr. Sidney Fernbach, Director, Computation Department, Lawrence Livermore Labs	2	2	1	1	May 21-23 1975
Dr. Jay Prespers Eckert, Vice-President and technical advisor to the President of Sperry Rand Corp.	2	2	1	1	May 23, June 3-4
Dr. Nicholas Constantine Metropolis, Group Leader, Los Alamos Scientific Laboratory	1	1	1/2	1/2	June 4, 6
Dr. Alan J. Perlis, Professor of Computer Science, Yale University	1-1/2	2-1/2	2	1/2	June 6, 11-12
Dr. Frederick Michael Scherer, Economist with the Federal Trade Commission on leave from the University of Michigan	1	3	1	2	June 16-18
Robert E. McDonald, President of Sperry Rand Corp.	2	5	2	3	June 19 July 1-3, 9
Max Palevsky, Former Chief Executive Officer for Scientific Data Systems – later Xerox Data Systems	1/2	1	1/2	1/2	June 24
James H. Binger, Chairman of the Executive Committee of Honeywell, Inc.	1	2-1/2	3/4	1-1/2	Sept. 22-24
Clarence W. Spangle, President of Honeywell Information Systems & Executive Vice-President of Honeywell, Inc.	1	6	4	2	Sept. 24-25, 29-30 Oct. 1-2, 6
William Charles Norris, Chairman of the Board & Chief Executive Officer of Control Data Corp.	1	3-1/2	3/4	2-3/4	Oct. 6-9
Robert S. Oelman, Former Chairman of NCR Corp. (retired 1974)	1	1	1/2	1/2	Oct. 14
John J. Hangen, Senior Vice-President, Corporate Affairs, NCR Corp.	1	8+ (+ Hangen on stand for 25 minutes on Jan. 21)	2-1/2+	5-1/2	Oct. 15-16, 20 Jan. 8, 12-15, 21 1976
John W.C. Lacey, Senior Vice-President of Control Data Corp.	1	3	1-1/4	2-1/4	Oct. 21-23
John William Weil, Formerly in charge of Advanced Systems & Technology of Computer Systems for General Electric; now with Bendix Corp.	1	2	1-1/4	3/4	Nov. 5-6
Winston R. Hindle, Jr., Vice-President & Group Manager at Digital Equipment Corp.	1	2	3/4	1-1/4	Nov. 13-14
Richard M. Bloch, Consultant formerly with Raytheon, Honeywell & General Electric	1	3-3/4	1-1/2	2-1/4	Nov. 17-20
John L. Ingersoll, Vice-president with General Electric, once associated with the financial aspects of GE's computer business	1	2	1-1/2	1/2	Dec. 1-2
Arthur D. Beard, Chief Executive Officer of Formation, Inc.; formerly chief engineer of RCA's computer operations	1	7	1-3/4	5-1/4	Dec. 5, 8, 10-11, Jan. 5-7. 1976
Reginald H. Jones, Chairman & Chief Executive Officer of General Electric	1/2	1	1/2	1/2	Dec. 9
Edwin S. McCollister, Director of International Market Development for Burroughs Corp.; formerly with Electrodata Corp. & RCA	1	8	3-1/2	4-1/2	Dec. 15-18 Jan. 19-22
Joseph William Rooney, Executive vice-president of data services group of Itel Corp.; formerly with IBM & RCA	1	8	4	4	Jan. 26-29 Feb. 2-5

The above chart lists the witnesses who have so far appeared in court on behalf of the government in its antitrust action against IBM. Designed to compare the time the government estimated would be required to examine each witness with the time it actually kept the person on the stand, the list also includes the total time each witness spent in the witness box, the time for which IBM was responsible and the dates the person was in court.

CW Chart Compiled by E. Holmes

'Explosion' of State EFTS Laws Found Matching Projects' Pace

By Toni Wiseman
Of the CW Staff

CAMBRIDGE, Mass. – The rapid passage of state laws on electronic funds transfer systems (EFTS) in 1975 seemed to parallel the accelerating pace of EFTS projects, according to a Harvard University report.

The study, conducted as part of Harvard's Program on Information Technologies and Public Policy, looked at the "explosion" of EFTS laws and its significance for financial and nonfinancial instructions as well as for consumers.

While nearly every one of the present 24 state laws defines or characterizes EFTS, most definitions are so broad they raise questions about the relationship of automated clearinghouses (ACH), bank card systems and telephone banking services to EFTS laws under "reasonable" interpretations of such definitions, according to the study.

"Moreover, the breadth of the language in EFTS definitions suggests that EFTS sponsored by nonfinancial institutions might fall within the scope of state EFTS laws under a 'reasonable' interpretation," the report said.

Problems With Laws

Part of the problem, the study found, has been the rapid evolution of EFTS. Any narrow definition will probably not fit new systems, while a broad definition could include some systems unnecessarily.

A second problem, the study said, is that "state laws force EFTS definitions to serve many purposes; for example, nearly every state EFTS law includes provisions permitting financial institutions to offer EFT services and other provisions regulating, restricting, or prohibiting EFT services."

The Harvard group suggested several ways of dealing with these problems, including omitting an EFTS definition altogether (as five states have done), keeping substantive regulations to a minimum or defining different categories of EFTS at the outset.

Fifteen Allow Sharing

Fifteen of the existing EFTS statutes permit or require financial institutions to share off-premise facilities, and at least four different sharing or access arguments are associated with the legislation.

Yet these arguments are often inconsistent with each other, the report stated.

One rationale for sharing might be to facilitate access to ACHs by thrift institutions which have, in the past, often been limited in their participation in ACH activities.

Another reason could be to eliminate the question of "Who owns the switch?" in proposed point-of-sale (POS) EFTS which permit transfer of funds via terminals located at retail stores.

The "natural monopoly" of a POS terminal could be a third rationale, the study stated, since it is possible that space limitations would give the first terminal

(Continued on Page 11)

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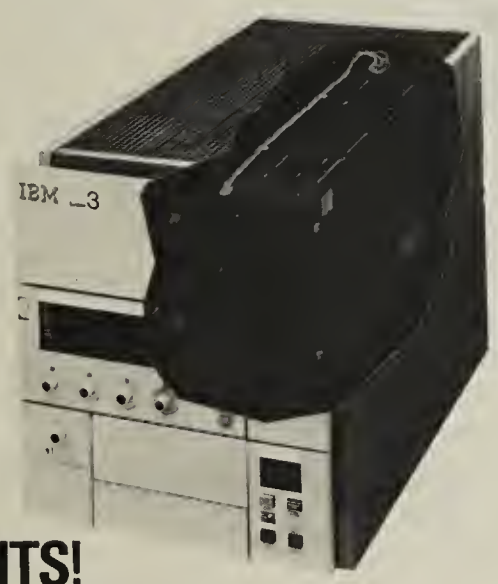

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Edelstein: The Sole Arbiter

THE JUDGE. . .David N. Edelstein, chief judge of the U.S. District Court for the Southern District of New York, is hearing U.S. vs. IBM without a jury and with a very small staff in comparison with the sizes of the government and IBM teams.

Now 66, Edelstein has responsibility for administering the courthouse, currently in the midst of renovations, and for ajudicating 24 cases in addition to U.S. vs. IBM. His staff consists of three law clerks, two court clerks, three to four court reporters, one secretary and two additional people in the court clerk's office assigned to keep the files in this suit straight.

A fairly autonomous group of professionals working within the federal court system, the court reporters employ two to three more people to type and correct the daily transcripts. The court reporters' office doesn't handle U.S. vs. IBM any differently from any other case except that unlike the procedures for transcribing most proceedings, corrections are made in this record on a daily basis.

CW Photo by N. French

While the court reporters don't seem to consider this trial an unreasonable drain on their resources, Edelstein has told the parties he has heard rumblings, presumably from the other judges in the district court, that this antitrust case is consuming too much of what the court has to offer – including its chief judge and one of the most spacious and regal courtrooms in the house.

Concerned about the slow pace of the trial and about his own longevity, the judge fears the mistrial of such a massive suit and has taken pains to make the record complete – occasionally to the point of lengthening the proceedings himself.

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Pace Still Slow In U.S. vs. IBM

(Continued from Page 8)

tions before the judge.

In seven cases, however, IBM and the government have taken the same amount of time and, in four instances, the Department of Justice has been responsible for keeping a witness on the stand longer.

Lead IBM attorney Thomas D. Barr's comment that "by the time the government finishes its direct case, there may be no need for a defense" aside, it seems too early to anticipate the length of time that presentation to the court will take. At last report, IBM had some 200 names on its witness list – over 130 of which were users.

U.S. Team Young, Average Age 32

(Continued from Page 8)

full-time support personnel, including economists, computer advisors, secretaries and clerks; and 20 part-time attorneys, many of whom continue to work in Washington, D.C., a Justice Department spokesman said.

The average age of the lawyers presenting the government's case in court is 32. Carlson is 53 years of age and Widmar is 41.

By the end of June of 1975, the Department of Justice had expended $3.8 million on the case, excluding the salaries of its personnel, according to the spokesman.

Figures spent on the case for the current fiscal year are not yet available, but the budget for the Antitrust Division of the department in 1975-76 was $22.2 million and it is estimated expenditures for the IBM trial now total approximately $4 million.

With a budget of $23.4 million for 1977, the division is expected to spend about $379,000 on the IBM trial in the 1976-77 fiscal year, according to the allocations made to the extraordinary or special litigation section by the department's Office of Management and Finance.

IBM In-House Staff Bolsters Legal Team

(Continued from Page 8)

presentation of the corporation's defense to the judge hearing the case.

Barr, 45, stated he could not estimate the size of his legal team's support personnel. The attorneys working on U.S. vs. IBM change constantly, he said, and frequently work on more than one case at a time. He noted Cravath staggers its staff in order to run a 24-hour-a-day shop.

In addition to its outside counsel, IBM has its own in-house legal staff headed by Nicholas deB. Katzenbach, an IBM vice-president and its general counsel and formerly U.S. attorney general and under-secretary of state.

Barr said he couldn't estimate how many people within IBM have been involved in the case in the six-plus years since its original filing by the Department of Justice in January 1969. Though the number could be as high as 2,000, he added, each of these people would have served the case on a part-time, once-in-a-while basis.

He likened the work done by IBM employees to that accomplished by hundreds of employees of U.S. agencies when IBM counsel was conducting pretrial discovery of government documents.

IBM considers the amounts of money invested in this trial to be "proprietary information" and would not comment when asked for a lump annual sum.

Laws Matching Pace Of EFTS Projects

(Continued from Page 9)

installer a monopoly position with adverse competitive effects.

"Finally, legislatures may have included provisions permitting sharing to allow smaller financial institutions to pool their resources in developing EFTS," the report said.

"One major problem in interpreting sharing provisions is the lack of an express policy statement indicating why shared systems are desirable, because the *reason* for sharing is related to what must be shared on what terms," the Harvard report stated.

Another problem with sharing provisions is the absence of an administrative and enforcement mechanism, it added.

Nonfinancial Institutions

With the exception of Nebraska's and Florida's laws, none of the present state laws give explicit attention to nonfinancial institutions.

Yet some of these laws have provisions which might encourage nonfinancial institutions participation, such as those suggesting that EFT services are not part of the "banking business."

"If state EFTS laws remain the basic legislative pronouncement in the EFTS area, an explicit policy statement regarding nonfinancial institutions might clarify the purpose of the laws and aid in their development through administrative and judicial interpretation," the study team suggested.

Consumer Questions

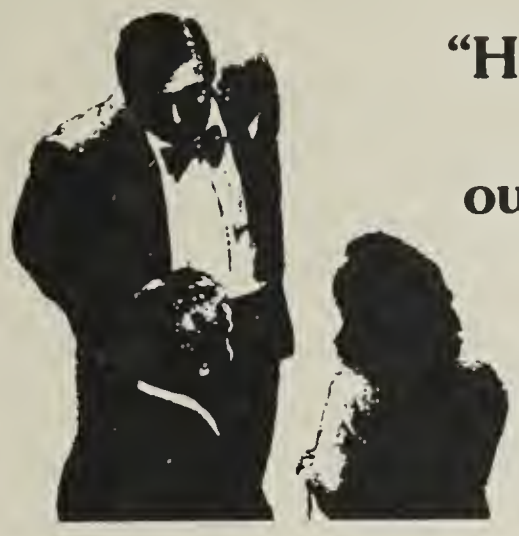
For the most part, EFTS laws are not consumer protection-oriented and provisions dealing with privacy and security, for instance, are rare and often superficial, the study said.

Three states do have substantive provisions dealing with privacy, however. Florida's law, for example, requires banks to inform consumers of their policies for protection against disclosure of confidential information and forbids the use of Social Security numbers as identifiers.

"On the other hand, no statute addresses the question of whether banks can use data obtained from an EFTS for internal purposes, such as assembling mailing lists, and Iowa answers the question of whether government might use the information obtained by an EFTS in the affirmative," the report stated.

Maryland, Rhode Island and Florida statutes require institutions to undertake various measures to ensure the security of EFTS, while Kansas, Iowa and Florida are the only states with provisions which might affect the liabilities of parties in situations where something goes wrong in an EFTS transaction.

"In each of the general provisions there appears to be considerable divergence on what particular issues deserve legislative attention and on whether the response should be to monitor developments," the Harvard team found.



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Director 'Disillusioned' Over Report of DP Foul-Ups

By Catherine Arnst
Of the CW Staff

BOSTON – A DP director for the state of Massachusetts said he was "disillusioned" when a newspaper article attributed delays in analyses of state spending for fiscal 1976 to foul-ups at the state computer center.

Inaccurate printouts have slowed preparation of the fiscal 1977 budget because "it's difficult to tell if we're in the red or black," according to one official quote in the *Boston Globe* newspaper.

"Truthfully, I think it was a cheap shot," Roger Banville, director of data-processing and telecommunications for the state, said of the *Globe*'s report.

The quarterly reports of state spending were held up because the budget for fiscal 1976, which normally would have gone into effect July 1, was not submitted to the legislature for approval until Nov. 15, he said.

The charge of inaccurate printouts was unfair, Banville continued. There were faulty printouts and delayed printouts, but this was because of incomplete and late data coming from the Comptroller's Office, which the DP center uses to prepare the reports, he said.

"That is completely untrue," Comptroller Arthur MacKinnon said. "All our input was up-to-date and in on time. Banville is just trying to pass the buck," he said.

The quarterly reports compare expenditures for the period with the budget and with expenditures for the same period the previous year.

Because of the delay in submitting a budget for fiscal 1976, "all we could do in the interim was compare expenditures with last year's budget," Banville said.

"We ran into a couple of problems because of the backlog we were dealing with," he said. The first quarterly report, which normally would have come due in September, was consequently not finished until Dec. 5, but the reports are now back on schedule, he said.

Banville has been with the DP department for six weeks, during which time there has been "significant reorganization" of the center, he said.

There were some minor problems, such as mixups in the tapes, but a new tape library has been installed which should solve that problem, he said.

There were also some problems encountered after the center was moved from the State House to its new headquarters where the operation has been consolidated onto one floor.

The move was made over Thanksgiving weekend, and the equipment was ineffective for about two weeks, Banville said. The center uses an RCA Spectra, which is now serviced by Univac.

There were also some problems with communications because of insufficient power in the new building, he said.

These problems have all been solved, and monthly analyses of the budget are now coming out on time, Banville said. The data coming in from the Comptroller's Office is a month behind, however, he said.

"We are at the mercy of the comptroller. If we don't get all the data in, then our printouts will be inaccurate. For them to blame me is foolish because the responsibility lies with the comptroller," Banville said.

Denied Charges

MacKinnon denied the charges: "The problem's not because of our department. We can't work with printouts that are inconsistent, and their printouts were inconsistent," he said.

"The September general ledger was wrong," he said, attributing the error to problems with the tapes.

MacKinnon left office at the end of January, but said he did not have a "sour grapes" attitude.

"Difficulties still exist in the DP department," he said. "We had a meeting, which Banville attended, two weeks ago to try and solve these problems" but they are still not solved, MacKinnon said.

Banville also described a meeting held two weeks ago in which he was asked whether there was a need for any additional hardware. "I asked them to justify the need for new hardware and they couldn't," he said. "I take this as a sign we're running on schedule."

Additional personnel were recently hired, but this was to handle the additional workload being added by processing Civil Service exams, he said.

"We were backlogging the Civil Service because of conversion to different disk drives. We are now very current. We are processing the data as soon as they give it to us," he said.

"I don't know why the newspaper article was written," Banville said. "We are not without problems, but you name me one center that doesn't have problems, and I'll apply for a job there."

Shipping Data Service Starting Next Month

LONDON – Lloyd's Register of Shipping and Lloyd's of London will start a computer-based joint shipping information service next month.

Lloyd's Register has built up files of shipping data to which Lloyd's of London, through its publishing subsidiary, Lloyd's of London Press Ltd., will be adding information on shipping movements and casualties received from an international network of agents, Lloyd's said.

Data can be supplied in the form of magnetic tapes, computer printouts and analyses or, for vessel histories, on microfiche, it said.

The information can be obtained in answer to one particular inquiry, at regular intervals or as a scanning service, it added.

The various file areas which have been computerized include general merchant ships; ships under construction; technical records; damages and defects; and fires and explosions, Lloyd's said.

Charges for the service will relate to the particular nature of the work involved, a spokesman added.

Most of the files are already operative, Lloyd's said, and clients who need shipping information should send their requirements in detail to Lloyd's/Lloyd's Register of Shipping Information Services, 4 Lloyd's Ave., London EC3N 3ED, England.

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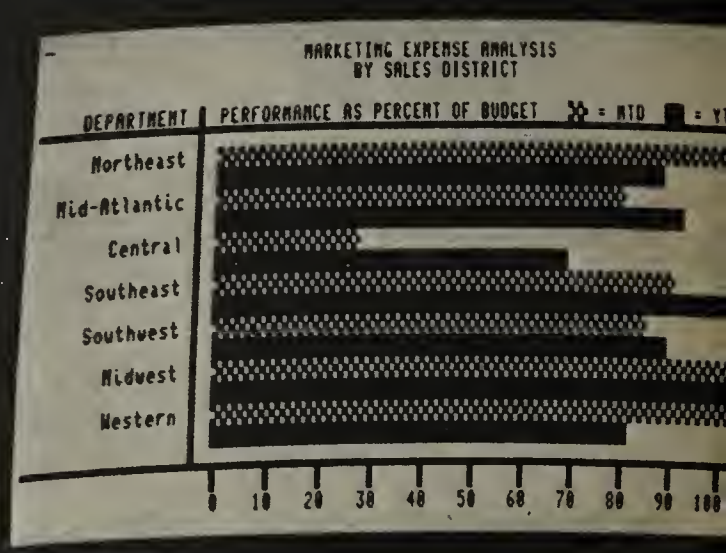

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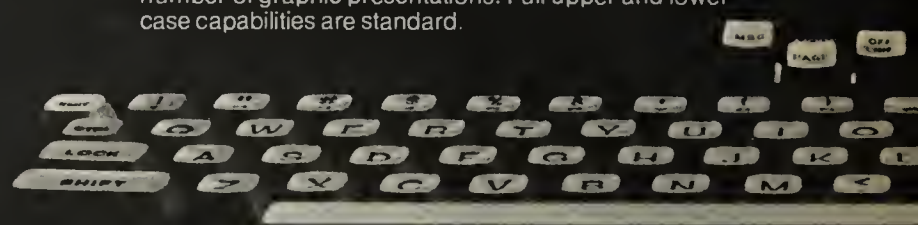

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To Pinpoint Hostile Countries

U.S. Using DP to Study UN Nations' Voting Patterns

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. – The State Department is using computers to determine which nations have demonstrated hostility toward the U.S. by their voting patterns at the United Nations (UN).

The Office of Multilateral Affairs was set up at the beginning of January to provide American embassies with data that will help them "improve bilateral diplomacy" with the nations with which they deal, John Washburn, acting director of the office said.

"If over time we find a country is hostile for no particular reason, we may resort to other measures," he continued.

Sources claimed these "other measures" will include denying aid to some nations in retaliation for consistently voting against U.S.-supported issues in the UN and in other international bodies.

Both Secretary of State Henry Kissinger and Daniel Moynihan, former U.S. Ambassador to the UN, have implied the U.S. will take a harder line on extending aid to those nations having a pattern of votes against U.S. interests.

Nations must be continuously hostile, however, before such action could be taken, and even then voting patterns would be only one factor in making such a decision, Washburn said.

The main purpose of the office, is to expand concepts of dealing with other nations through use of computer facilities, he said.

They 'Don't Understand'

"We've become aware that many nations don't fully understand the issues coming up in the UN and their importance to the U.S.," he said. "We are not collecting these votes with plans of retaliation.

"We hope that by improving our ways of dealing with these nations we will be better able to explain our position to them," he said.

The office was set up because of the increasing membership of developing nations in the UN and the "increasing need to explain to these nations more fully our policies," Washburn said.

"Our working hypothesis is that, if we find an unfriendly nation, it's because we haven't fully explained ourselves to it. We're not going to assume any country is hostile to us till we give it a chance to change," he added.

Although the "need was felt for the past two years I've been here," proposals for the office were first made in September, Washburn said.

The Information Systems Shop of the State Department has been working on the UN voting records for about six months, however, Michael Mercurio, chief of user support systems, said.

The data base is being developed on the State Department's IBM 370/158 with all the programming done in-house.

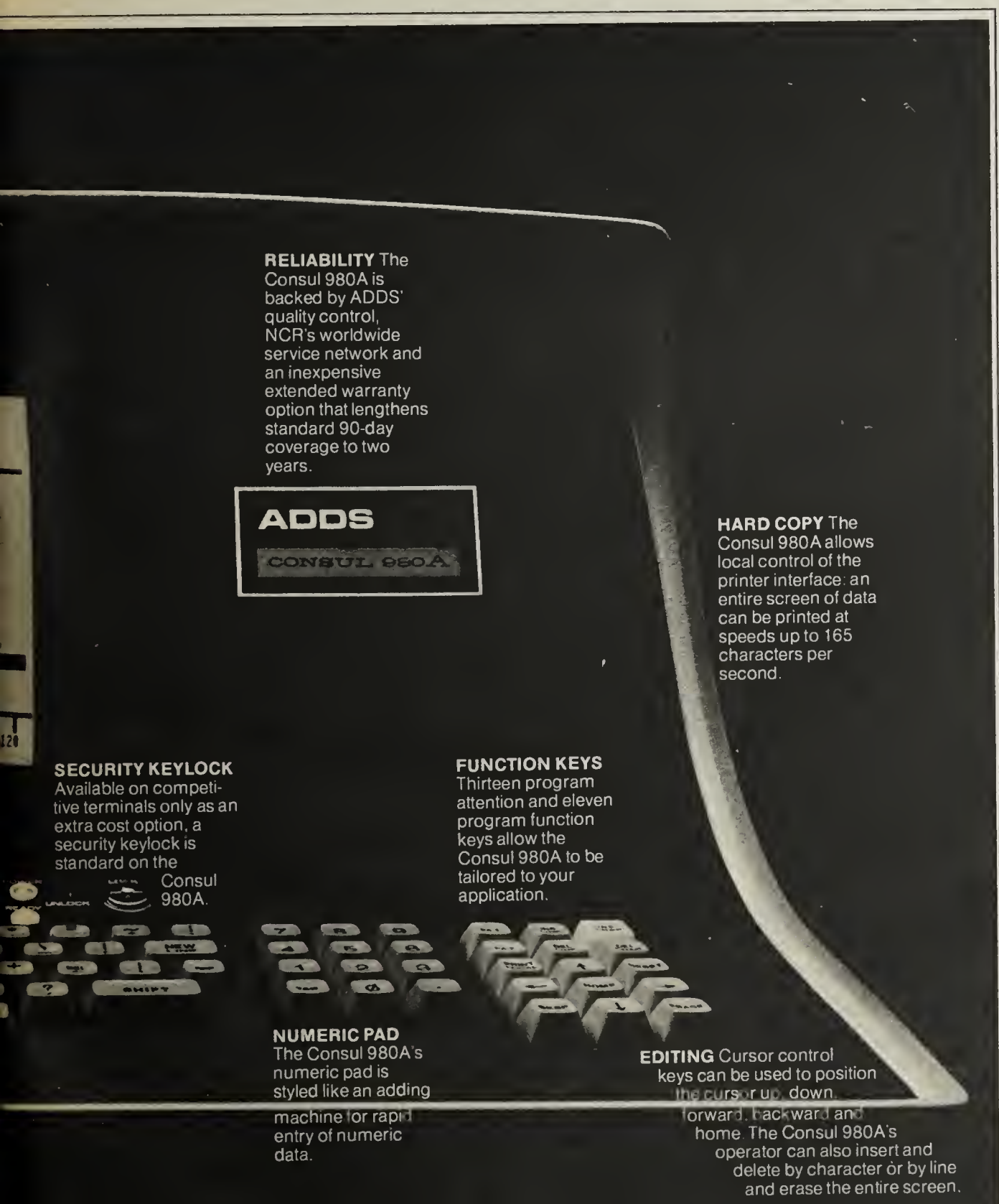
"We already had all votes since 1970 in the system, and we have since gone back and verified them," Mercurio said.

"We are adding 1975 votes in a batch mode now, which will take another couple of weeks," after which votes will be put into the systems immediately, he continued.

Besides General Assembly votes, the system will include votes in committee and in other international forums such as the Organization of African Unity. Hardcopy printouts will list each vote by subject, results, group votes and country.

There is also weight factor subjectively assigned by the UN Political Affairs Office in the State Department to those votes considered important to U.S. interests. There were approximately 17 to 19 of these votes in 1974, Mercurio said.

Kurt Waldheim, secretary general of the UN, is said to be critical of reports that U.S. economic aid will be linked to votes at the UN. "Aid should be given to those in need, to foster economic growth and create better living conditions," he said.



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King County Offer Still Open to Seattle Despite Sale of CPU

SEATTLE – King County, Ore., which had offered to share its DP facilities free with Seattle [CW, Jan. 5], is selling one of its twin IBM 370/155s, on which it had planned to run Seattle's workload.

The move does not negate the offer to the city, according to Helmut Endres, manager of King County's Systems Services Division. The remaining 370 should be sufficient to handle both the city and county workloads, he said.

Why the county had 1-1/2 more 370/155s than it needed in the first place is a combination of technological progress and changing requirements, Endres said.

King County has had two IBM computers for some time, he said, dating back to the time when 360/50s were used for batch work. The machines served to separate the two kinds of workloads and provide backup for one another.

About five years ago, when the 360s were saturated, a consultant was hired to evaluate alternatives. He recommended two 370/145s, but then newly available 145s could not be obtained in the time frame needed by the county. Instead, the two larger 370/155s were ordered.

County software systems maintenance programmers then added core and made other configuration changes to improve the efficiency of the 155s. At the same time, improving system reliability cut sharply into downtime.

As a result, with only three hardware problems in the last 22 months, the need for a backup computer evaporated, Endres said. The workload was manageable on the remaining enlarged 155, which is being further expanded to a 3M-byte memory in anticipation of the Seattle workload.

Meanwhile, the sale of the surplus 370 brought $821,384.50, about $100,000 more than the county had expected to receive. County officials have not yet decided what to do with the money.

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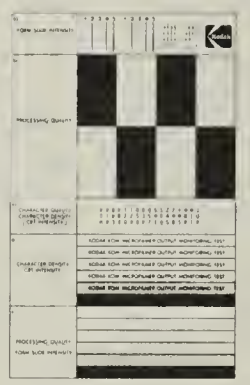

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Prison Programmers 'Get the Business' From Government

LEAVENWORTH, Kan. – A group of inmates at the federal penitentiary here is "getting the business" from the Federal government.

The group is comprised of about 50 computer programmers who are enrolled in the prison's vocational training program.

It has developed about 300 computer programs for the U.S. Agriculture Department's Stabilization and Conservation Service since 1972, using the prison's in-house NCR Corp. Century 200 mainframe.

Now the programmers use a Leasco, Inc. terminal connected to a large-scale computer by dial-up telephone lines. The computer is part of the Computer Sciences Corp. (CSC) Infonet remote-computing network.

Proposed by Government

The prison's computer equipment and the Infonet network services are provided by Federal Prison Industries, a government corporation which employs inmates and provides products and services to other federal agencies.

The addition of the remote-computing service helps inmates' business prospects in several ways, according to Al Stober, DP supervisor at the prison.

The network enables them to develop new computer programs faster and easier, because they can "talk" to the distant computer and correct their programming mistakes as they go along.

Training Available

The inmates are also able to train in the latest programming techniques, acquiring a broader education in computer technology than was possible before, and use their skills to develop more technically advanced programs for federal customers.

In addition, since some federal agencies also use the network service, the inmate-developed programs will automatically conform to the system requirements of many more potential customers.

Paid by Hour

Paid an hourly wage, the inmates develop their programs from government-supplied specifications. Among those they have developed on the prison's computer are accounting programs that help the Agriculture Department keep track of the tons of wheat and other grains in storage around the country.

Future plans for the prison's DP vocational training program include the acquisition of three more Leasco terminals, according to a CSC spokesman.

The prison also plans to use its computer as a high-speed terminal to communicate with the network because it can emulate IBM network-compatible 2780 protocols, the spokesman said.

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Bill Covers Private Sector

H.R. 1984 Hit as Burdensome for Business Community

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – If passed, the Koch-Goldwater Bill – H.R. 1984 – would saddle the entire business community with the most burdensome general federal legislation imaginable, according to *Association Letter*, a publication of the U.S. Chamber of Commerce.

The bill was introduced in the House of Representatives last year to establish privacy safeguards for information maintained by private-sector organizations.

The cost of applying its concepts and their logical extensions to all businesses and to all files "would be so high that it cannot realistically be estimated, and the real, practical benefits to consumers would be questionable at best," Francis M. Gregory Jr. said in an article entitled "Privacy: Business Has a Lot to Lose."

Americans Shocked

Gregory pointed out that Americans are shocked when they hear existing technology would allow an organization to create a single computerized data bank containing the equivalent of 20- to 30 typed pages of information about every U.S. citizen and to receive any person's file in a few seconds.

"All too often, it is assumed that what is technologically possible is in fact being done," he said.

Such assumptions often ignore practical considerations of need, cost and benefit that are second nature to the businessman but which tend to be carefully buried by those interested in legislating abstract principles to combat theoretical abuses, he said.

FCRA 'Reasonable'

One major federal statute, the Fair Credit Reporting Act (FCRA), has been enacted to limit a private organization's right to collect and use information.

The FCRA primarily concerns the alleged problems associated with the reporting of information for credit, insurance and employment purposes. It does not attempt to include all businesses under its provisions, he said.

Although "the FCRA is not without defect, at least it uses the reasonable approach of tailoring legislation to cover a specific area of concern," he said.

Covers Broad Range

This may be sharply contrasted with privacy proposals such as H.R. 1984, which would establish general restrictive requirements applicable to every business record containing any individually identifiable information.

The Privacy Act of 1974, as enacted, deals with records containing personally identifiable information maintained by federal agencies. "It would be quite easy to change a few words such as 'agency' to 'any organization' and apply the act's concepts to all private businesses," he said.

Gregory, who is a partner in the law firm of Sutherland, Asbill and Brennan, pointed to the Privacy Protection Study Commission as one of the compromises that marked passage of the Privacy Act.

'Objective Study'

"Despite the fact that the House [of Representatives] saw fit to appoint to the commission the two cosponsors of H.R. 1984, Edward I. Koch (D-N.Y.) and Barry M. Goldwater Jr. (R-Calif.) the commissioners will be able to conduct a careful and objective study of this complex subject in the short two-year period during which the commission must prepare its report."

No one should expect, however, that all commission members will examine the privacy issue in an air of complete objectivity, totally free of bias and opinion, he said, adding that it is up to Chamber of Commerce members to make their views known.

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Editorials

The Record Speaks

"U.S. vs. IBM reminds me of a soap opera. You can stop in at the courtroom one day, come back three weeks later and the same testimony, the same objections, the same rulings can still be heard," an occasional observer of the government's antitrust action against the industry leader recently joked.

But the best humor is based on fact, and unfortunately, though exaggerated, his comments caught the essence and tone of the case now at trial in New York City.

It would be difficult to argue that 21 witnesses in 23 weeks isn't an extravagant use of time, particularly when that fact provides the only realistic basis for determining the length of the remainder of the government's case and the trial as a whole.

To the lay observer, much of the time spent in court is wasted with extraneous testimony, with squabbles between the attorneys, with the unending attention to what the *real* definitions of words like "equipment" and "systems" are and what their usage should be.

Often, concern for the completeness of the record seems to outweigh any interest in uncovering whatever degree of truth is to be found in the specific monopolization charges leveled against IBM by the government.

From a legal viewpoint, it may very well be that time isn't being squandered. Yet the judge's stated impatience with the pace of the trial would seem to support the lay view.

But even the judge, as well as counsel for IBM and attorneys with the Department of Justice, is fond of saying "the record will speak for itself."

Thus far, the record certainly does speak to the delays, whether designed or unintended, in the case. And everyone involved is responsible for them: judge, IBM lawyers, government attorneys.

Even in a soap opera, someone or something (other than time) forces the plot to move forward eventually. On behalf of all those concerned with the suit and all those who may not be interested, but who are paying for it nonetheless, we look for some progress in this case — and sooner than "eventually."

Time for a Moratorium

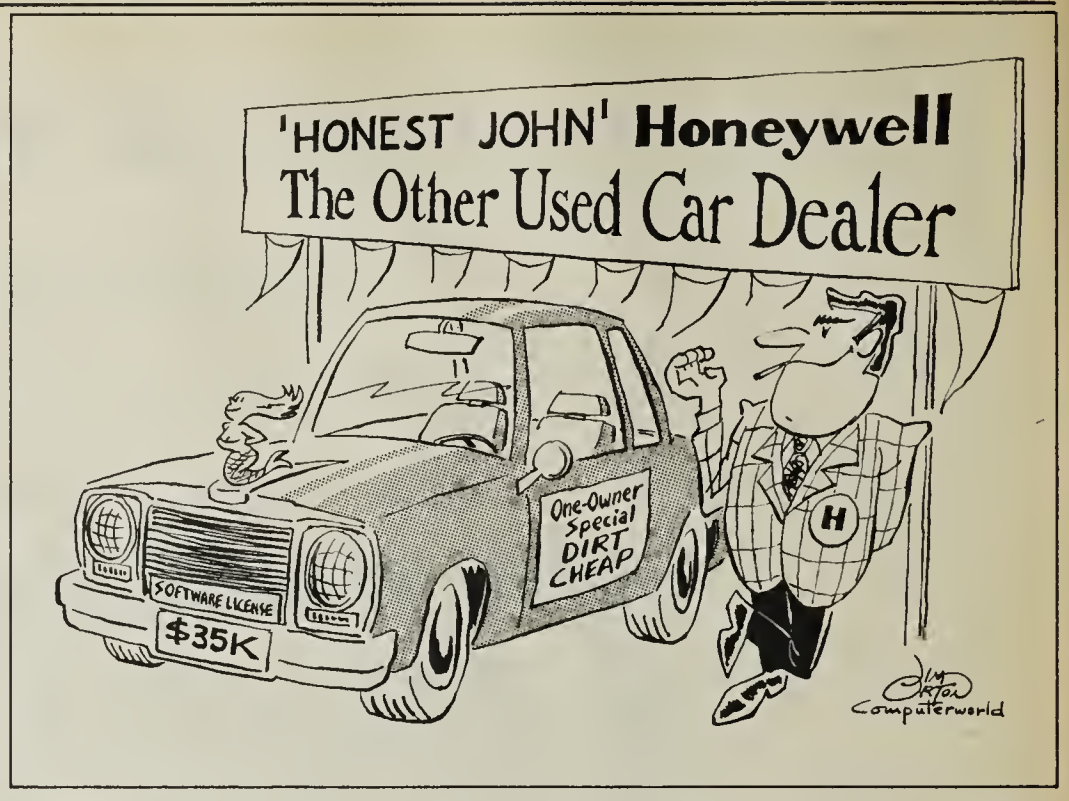
While the National Commission on Electronic Fund Transfers has finally named a staff director and held its first meeting, it has yet to file a report.

Nevertheless, 24 states have already passed legislation governing the use and propagation of electronic funds transfer systems (EFTS) (see story on Page 9).

Provisions in these laws are not only often contradictory, but in many cases nebulously worded, with no eye to future developments in EFTS.

Others such as the Iowa statute which permits the Federal government to access and use data collected by EFTS, are potentially harmful to the consumer.

It is time for a moratorium on the enactment of laws and the development of new systems relating to EFTS questions until the commission is finally activated and files its recommendations.



Letters to the Editor

Editorial on Price Marking Based on 'Shaky Assumptions'

Once again *Computerworld* has produced a shaky editorial, this time under the title, "Shaky Assumptions" [CW, Feb. 9].

The shakiest part of the editorial was the assertion that "we now know consumers become upset when their prices are threatened with extinction." If this were true, stores which had taken this approach many months ago would now be empty.

The facts speak strongly to the contrary; stores without prices have generally added customers, not — as CW would have its readers believe — lost them.

The second shaky assertion was that attempts to increase efficiency and lower prices should be abandoned because customers want to "exchange pleasantries" with the cashier.

I suspect that most customers desire efficient, low-cost service so they may get on with the activities of their lives which are more meaningful than having their grocery purchases itemized.

I know it is stylish to attack attempts to automate. However, CW, perhaps more than any other publication, should be committed to getting at the real issues: improving customer service, while decreasing distribution costs and increasing productivity.

David M. Carlson

Detroit, Mich.

Proximity Essential, Fun

With due respect to Herb Grosch's editorial, "Artifical Intelligence and Natural Stupidity" [CW, Feb. 9], color both his hats black.

As one who makes a living inventing practical devices, I cannot find within his article any justification for gutting theoretical work on artificial intelligence (AI).

Stop work because a good definition of AI hasn't been found? Should Grosch stop writing because he admits he can't define his field of fire? Even if AI did get defined, I would still have people knocking on my door asking me to plant a bug.

Separate the theoretical from the practical? Sooner let the two Groschian hats be split asunder.

It is well known that ideas flow from theory toward practice, but the reverse happens also.

As in all intercourse, proximity is not only essential, it is fun.

Arthur W. Holt
President

Arthur Holt, Inc.
Annapolis, Md.

A Self-Appointed Expert

In his commentary, "Documenters Should Write Well, Have Some Technical Background" [CW, Feb. 9], Joseph T. Rigo struck me as being typical of the self-appointed experts.

He could have used about half as many words and said the same thing more effectively. He could certainly profit from taking an English course.

Any engineer or professional worthy of the name knows how to communicate, including how to write, and he knows how. He knows it is a fact of life that it is more important to know how to put an idea across than to have the idea.

I wonder if Rigo is a free-lance writer by choice.

Henry Porsche

Indianapolis, Ind.

(Other letters on Pages 18 and 22)

Data Past

Five Years Ago
Feb. 24, 1971

NEW YORK — Honeywell Information Systems (HIS) strengthened its large-scale computer line by adding a six-model 6000 series with new business processing capabilities. The series is an outgrowth of the GE 600 line. Designed to compete with IBM 370s as well as the Univac 1100 series, the new RCA line and Burroughs B700s, the 6000 series is exceeded in power at its top end by very few currently available systems, HIS said.

— — —

CHICAGO — Elektra Industries and its subsidiary, Timeshare Network Corp., filed a $7.1 million antitrust suit naming Honeywell, Inc. and National Computer Franchise Corp. as codefendents. The plaintiffs asked, under the Clayton and Sherman Acts, to determine that there has been a conspiracy on the part of the two defendents to restrain trade and establish monopolization.

Eight Years Ago
Feb. 21, 1968

NEW YORK — Profits from Univac computer operations are "well on the way to becoming the leading contributor to Sperry Rand's earnings," J. Frank Forster, president, told a meeting of the New York Society of Security Analysts. Univac is also the fastest growing segment of Sperry Rand's business, Forster said. Contributions to corporate profit have been increasing with each quarter and have been continuous over the last 27 months, Forster said.

— — —

NEWTON, Mass. — An automated vote-tabulating procedure developed by Seismic Corp. produced incorrect results in last November's elections here. An investigation of the results placed the blame on a 1401 encoder program which contained between 50 and 70 patch instructions which were not fully tested prior to the election, according to E. Crossland, national sales manager of the Seismic Voting Products Division.

Snoopy and His Friends

Back in 1968, when Pluto was a pup – no, wrong comic strip; say, when Lucy was charging only two cents – the august and impenetrable National Academy of Sciences, the U.S. Royal Society, inaugurated a Computer Science and Engineering Board, headed by Tony Oettinger, just escaped from the ACM presidency. Funding was secretly provided by the Defense Department, to the tune of $100,000, and in return the Board set up a classified panel, from which government observers, even those who like myself had top clearances, were barred. The reports of that panel were used by the Pentagon to bolster its opposition to the export of major computer systems to the Soviet Union – an opposition which continues to this day, and which has cost us much prestige in the Second World, and several hundred million dollars of juicy exports besides.

The academics, who needless to say far outnumbered the real-world members on the Board, contributed their meager but prestigious talents most willingly to this dubious effort, which undercut a formal and much more open Commerce Department advisory committee. In return, they were encouraged to butter up a few slices of the loaf for themselves: there was a summer program on curricula, I remember, and help in getting funding for a book. The members from DEC and IBM held on to their (corporate) purses, and kept quiet; IBM, in its usual insidious way, contributed a free senior staff man, and thereby made sure it knew what went on behind the scenes – which is where most things *do* go on, in such cabals.

Well, they wanted to monkey around in standards, which got my back up – I was not as tender-toed as most bureaucrats, but the thought of Federal/national/international standards being manipulated by the likes of Oettinger and Perlis, with "help" from the IBM-contributed staff man, gave me *fits*. I screamed loudly at every meeting they let me attend, recommended to my bosses at the Bureau of Standards that they protest to the Academy of Sciences, bearded the then-president of the Academy, Fred Seitz, in his Constitution Avenue lair (and was contemptuously turned away). When the Board was remanned in 1971, having failed notably in most of its contrivings except probably the classified export control matter (how could one know?), I wrote a polemical letter as a private individual, "an old observer and a very concerned citizen and professional," which recommended to the refurbished group that as their first order of business they discuss whether to disband. I heartily recommended it: "You are not needed and you are not wanted."

Whether my protest, and the much quieter and probably more effective ones of other key people in the trade and/or near the Academy, had much effect I can't be sure. But a year or so later the horrid little bunch was dismantled; the academics filed their last expense accounts – wistfully, no doubt – the industry boys shrugged, the neutrals were probably just dazed. Anyhow, thank Heaven, the dumb thing died.

Now, by thunder and lightning, they're doing it again! Urged on by those latter-day Oettingers, Jean Sammet and Tony Ralston, the current president of the Academy has established planning groups, one under a Prof. Richard Karp of Berkeley, one under Ivan Sutherland, of SKETCHPAD fame. I don't know yet what their exact charters are – needless to say, everything is very private – but I fear we have another Highbrow Community adventure out toward policy. If they stick to Academy matters, such as the proper placement of computer "science" in the organization (I have always recommended the Academy of Engineering, which has quite a few of our senior trade people, as against the Newell/Simon types on the older side of the house), great! We can use a better relationship; the old one is practically nonexistent, and to the extent that it does exist, is *mucho* obsolete.

But if they want to mess around in standards, in EFTS, in control of hardware and technology export, in antitrust and government procurement policy – whoo-eee! I'll fight from behind every hedgerow in the computer countryside.

The Karp committee, whose very existence I hadn't known of until early this month, has been chosen, has met, has decided what it wants, and is drafting its report. The Sutherland bunch is so secret I don't even have their names yet, but I assume from some hints Dr. Karp dropped that they too have finished, ah, disposing of our snivelling little business – all tens of billions of dollars worth of it!

I've begun a campaign to get these reports out in the open: ACM, AFIPS, *Computerworld*, the Freedom of Information Act if I have to (presumably Uncle Sam is at least paying the professors' expenses). One major thing that needs to be said is, THERE IS NO HURRY! Watts is not burning; the Arpanet is still, you should pardon the expression, functioning; IBM is still profitable. Let the user community, let consumer advocates, let a few nay-sayers hear what these people propose. Is the National Research Council to establish a policy group? That may be good, may be bad, depending on its charter. Who will be on it? Jack Jones? Great! Bernie Galler? Hmmm! How many of each? Dan McCracken?

I'll bet you all the birthday cakes in Red China I can tell you *one* guy that won't be on it, though: four initials, and I don't mean J.C.R. Licklider!

I'll keep you posted.

Herb Grosch

Statistics Improving State of Art in 'Check-Digitry'

Statistics have been used recently to determine the incidence rate of errors for the various methods of "check digitry" (a term that came from England after the *Financial Times* there reported on this series of columns on check digits).

The Taylor Report
By
Alan Taylor, CDP

This is not surprising, because the type of errors traditionally occurring (single errors and the transposing of two digits) are easy to study from a statistical angle.

Moreover, these statistics have been valuable because they have permitted us to avoid some of the poorer methods and to look critically at those we do use.

From a practical standpoint, statistics could do no more. The classical justification for treating things statistically was that they were simply too large to treat individually.

Classic thinking, however, didn't have computers to use. Magdy Riskalla, a Babson College professor of statistics, did have access to a computer, and some of his recent work in the area seems to have gone well beyond the classical limits.

As a result, we may be able to avoid issuing numbers that will slip through our check-digit-based checking.

This way, the different check-digit methods all become equally efficient in use, differing only in the difficulty of finding the "safe" numbers that can be used and that will be checked by the appropriate check. And that is quite a jump in the state of the art – if we can make it.

Riskalla Approach

The Riskalla approach was based upon the observation that the arithmetic sum of the digits doesn't change during any transposition. Thus, the number 1, 2, 3, 4 and 5 will add up to 15 whether they are arranged 12345, 21345, 32145, 42315 or 52341.

This means the set of numbers that are simply transpositions of one another can be concentrated into a much smaller group than would otherwide have been the case.

For instance, in checking the relationships within five-digit numbers, Riskalla was able to break down the 100,000 possible numbers into 46 separate groups, depending upon the sum of their numbers.

The size of the groups varied, naturally, with only a single number being in either group 0 (00000) or group 45 (99999) Still, this greatly reduced the numbers which had to be considered.

Then Riskalla used the same breakdown within a specific check digit. First he individually identified all the numbers that would be allocated a check digit of zero. These were then broken down into the 46 groups, based upon the sum of the digits.

Now he had a list of all the numbers that would both have the same check digits and the same digit sum. All possible transposition error situations had to be contained within these groups. So this was as much as is needed for the next examination.

It turned out that the examination for five-digit numbers came down to a maximum number of groups of around 600, from the original possible 10,000 numbers all with the same check digit. So the technique works.

The next step was to examine the numbers to see whether there were going to be any transposition possibilities which would not be caught by the checking because both the correct and the transposed numbers would have the same check digit.

Figure 1 shows the results of such an examination. It shows the 17 numbers which all have both a check digit of 5 and a digit sum of 6.

It can be seen that these break down into groups, with, for instance, 402 and 40002 both being included in a single group. If we rewrite these as 00402, this shows that it is, in fact, simply a transposition of 40002.

```
*****************************************************************
The Sum of the Numbers=6          The Number of Numbers=17
*****************************************************************
402   2031   2130   3210   5001   5100   10113   10311
11103   11121   11310   13200   20211   21210   31011   31110
40002
*****************************************************************
```

Figure 1. The output above, produced by Riskalla, allows the error-prone numbers to be segregated from nonerror-prone numbers in a particular check-digit investigation. This may lead to a new way of looking at check-digit use in computers. The example is based on the Deeds check-digit method [CW, Oct. 22].

Now that we know both will have the same check digit, we know it would be dangerous to issue both numbers. We have isolated our first error-prone pair of numbers.

Other ones that appear in the group are 2031 and 2130, 5001 and 5100, 10113 and 10311, etc. What they are is not particularly important at the moment. What is important is that here we have isolated the actual error-prone element (from the transposition operation).

We have also isolated the non-error-prone elements, which may be even more important. For instance, 11103 is such a number because there is no number which, when transposed will have the same check digit (under the system being examined).

Each of the other transpositions, 11013, 11130, 11301, etc., have different check digits and if used will be routinely caught. So 11103 is a good number to use.

So there you have it. It is now possible apparently to isolate both the good numbers and the numbers that make the check digit inadequate checks when two different transpositions are used.

Now the question is what to do with this new knowledge. As always, your comments are welcome.

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Letters to the Editor

Selling Systems to Russia Like Digging Our Own Grave

I just could not let Herb Grosch's remarks on "Exports and Security" [CW, Jan. 19] go unanswered.

I can't claim to speak for Sen. Byrd or anyone else, but hopefully I can shed some light on why I oppose selling our computers to the Russians.

Quite simply, if I am to be murdered, I will die happier if I have not helped the murderer develop the murder weapon. I may wind up equally dead in any case, but at least I haven't let the murderer make a sucker out of me!

Donald S. Schmick
Atlanta, Ga.

Business Must Set Morality

On the issue Herb Grosch raised regarding export controls, although it galls me to admit it, I half agree with "the curmudgeon of Cupertino."

The major issue for export controls goes far beyond specifications on some list of forbidden products or another. The point is that no government really should have the right to control the trade of its private citizens, particularly for political purposes.

A necessary corollary of this is that any private citizen wishing to trade abroad should be willing to shoulder the entire risk himself, and he should not expect the government to come running if the customer turns out to be a deadbeat or a thief.

Any citizen or corporation that wishes to take the risk of trading with the Soviet Union, China, Cuba or whatever country or organization it chooses, should be able to do so. If Control Data Corp. wants to sell Cyber 173s, fine, let them.

However, management should be willing to accept the following kinds of risks without being able to rely on U.S. government assistance: the Soviet Union might decide to pay a cash balance in 20-year bonds; China might decide that paying $20,000/mo for software is unwarranted and stop paying; more interestingly, the U.S. government might well decide not to buy any more CDC products, since CDC is no longer cooperating with the government.

Selling high technology means selling control. If the government gets out of the business of setting economic morality standards, every businessman must do it for himself.

This is not necessarily true for other forms of trade. Trading wheat for dollars (or gold) may certainly free up resources that might otherwise be used for feeding hungry people, but the most morally objectionable aspects are diminished.

To summarize, I agree with Grosch that the government shouldn't try to interfere with trade. I disagree in that I feel that Americans, deciding on their own about their trading partners, should decide not to sell high-powered technical goodies to dictatorships.

Michael R. Leavitt
Reston, Va.

A Mishmash of Nonsolutions

Kenniston W. Lord Jr. really has his speech down pat [CW, Jan. 19]. Having fostered the Society of Certified Data Processors (SCDP) licensing bill, he can now grind out daily letters of the form:

"The [SCDP licensing] proposal, if taken in its entirety, might have prevented (substitute current front-page example of computer-related disaster)."

I am not convinced! I have carefully perused and pondered the SCDP bill as it was introduced in the Delaware state legislature last year. I found it a mishmash of hand-waving, stereotyped nonsolutions such as "x years experience" and "review committees" (experience in what – reviewing what – unspecified), and other non sequiturs that sounded suspiciously like a plan to grant retroactive mobility to those who took the Certificate in Data Processing (CDP) exam in its "lean and hungry" years.

Did Lord inquire whether the creators of the Florida Crime Information Center (FCIC) death trap would have qualified under the SCDP proposal? I'll bet they could have! What will Lord say when the first "duly-certified" system kills someone?

I agree that truly professional standards and enforcement are long overdue in DP. I expect the industry will get regulated before it regulates itself. I do not agree that the SCDP bill would produce effective regulation.

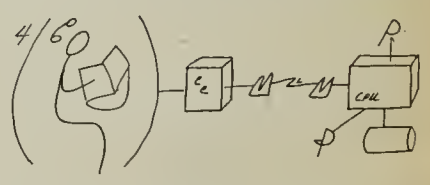
Far more likely, I fear, is that it would enshrine the current widespread incompetence as "accepted practice" and discourage the spread of truly effective methods of reliable design.

Robert Higgins
Brooklyn Heights, N.Y.

Free-Hand Symbols Helpful

Existing flowcharting symbols are great when you have a template and a large sheet of paper. But, what happens when you lack these tools?

I have found the following free-hand symbols helpful when sketching systems.



This sketch depicts a group of four telephone customer inquiry stations communication through a cluster controller, modems and a leased line with a processor supporting a line printer (P), an on-line file and a keyboard printer (system console).

These sketches are easy to draw with a minimum of practice: the hardest, the display terminal, is easier if you start with a written "D." Boxes can be a multiplexer, "MUX," or concentrator, "CON," and they don't have to be three-dimensional.

When multiple devices exist in the same sketch, subscripts can be used.

I find these sketches particularly helpful when explaining configurations to managers or executives.

R.G. Garvey
Kansas City, Mo.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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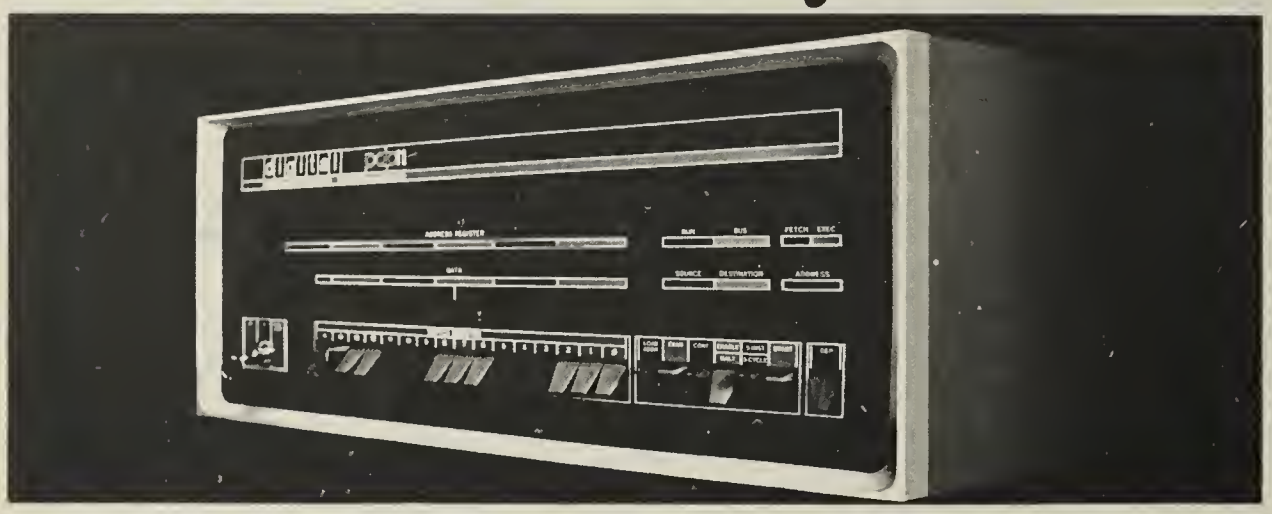

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7805	16K NMOS in Add-on Chassis	PDP-11 FASTBUS	Up to 128K on the FASTBUS (64K in 5¼" Chassis) Includes Parity	$19,000 (64K words)
7711	8K/12K/16K NMOS Add-In	LSI-11	High density, High Performance	$1560 (16K x 16)

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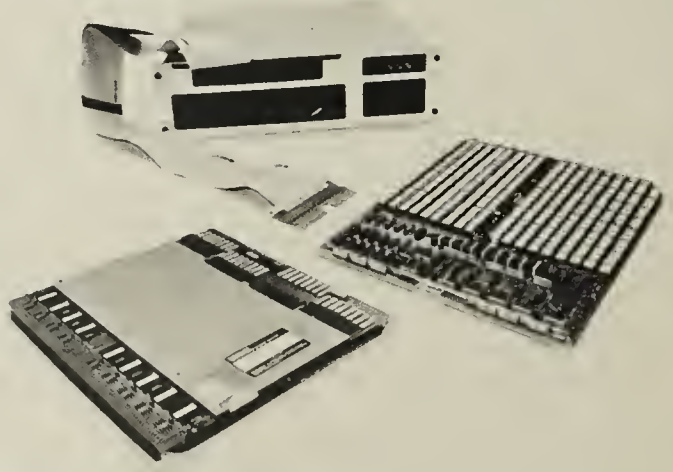

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At a time like this a slip-up can cost you plenty.

The same thing is true in high-density recording.

A lot of companies have found out the hard way that trying to use bargain-priced, uncertified computer tapes on today's high-density drives is no bargain after all. Sooner or later, the masking done with the GCR format will catch up with you. Ask your Graham product technology man to explain.

That's why Epoch 4 is so important in an upgrade. For just 6¢ a month per reel you get tape that's certified error-free.

If you're getting into high-density equipment, better get Epoch 4.

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'Help Wanteds' Want Too Much Help, Often Overestimate Site's Real Needs

By Larry Hires
Special to Computerworld

When was the last time you looked at the employment section of your local newspaper or in the national periodicals or journals for a DP position? And what did you see?

Chances are overwhelming you ran across an ad which specifically wanted someone who had experience with OS/MVT, Hasp and VS-1. Or one which required MCP, NDL and teleprocessing network design experience. Or perhaps one which required Century 101 experience with Neat/3 programming. Chances are good that you have even contributed to the writing of such an ad.

So what is the issue? Don't those installations know precisely what they want when such an ad is placed? And don't they have the right to narrow the list of candidates to those whose talents and experiences coincide with the installation's needs?

Reader Commentary

Ads Raise Questions

No quarrel with the rights of the installations; this is still a free county. However, serious questions can be raised about an installation knowing its true needs when there is a requirement in the ad that the applicant must have highly specific knowledge of one specific vendor's software and hardware.

Every reader of this article knows he has been unfairly eliminated from some good jobs because there is some one requirement in the ad he can't meet and that, in all likelihood, is not a true requirement for successfully doing the job.

Assuming there really are very specific requirements for an applicant to know certain highly technical facts in order to perform on a given job properly, a fair question might be raised as to whether an applicant's overall knowledge and abilities might allow productive work to be performed immediately while he obtains the knowledge necessary to do the job completely and satisfactorily.

Attack on Expertise in Print

This is not the old tiresome theme of generalist vs. specialist dressed up in DP jargon. There are places for both in this industry.

This is an attack on the notion that a DP installation's needs can best be met by requiring only technical expertise in print and eliminating or selecting applicants on additional factors brought out in resumes or personal interviews.

Are there not skills that an individual might possess which are of far more worth than whether he can do an OS Sysgen at the console typewriter during lunch with no references to the latest SRL?

The point having been made, let us suggest what these types of ads might say by looking at an applicant from the vantage point of a company executive, rather than from the view of a DP manager who just lost his star object code programmer to Univac.

Let us also keep in mind a question many company executives ask themselves frequently but seldom aks the DP department: "What is the economic justification of the computer in the first place?"

Lost Question

That question is somehow lost on too many technically oriented people. How many programmers, analysts and DP managers know the true cost of the computer installation where they work and the cost justification for its existence? How many venture past the point of technical feasibility for an application onto the less solid ground of cost justification or labor-saving analysis in order to properly appraise management of the economic advantages or disadvantages of embarking on a new project?

Going a bit further, how many are truly creative when it comes to solving a management problem? Why don't these ads require these skills as well in order to attract the very best people?

How many ads ask for proof of expertise rather than proof of longevity? (Did you ever see those ads requiring five years experience in ANS Cobol? No expertise, mind you, just five years exposure.)

How many ask for proof of ability to learn quickly rather than proof of knowledge which is already held? How many ads promise an opportunity instead of a salary range?

Hires is president of LXH, Inc. in Tampa, Fla.

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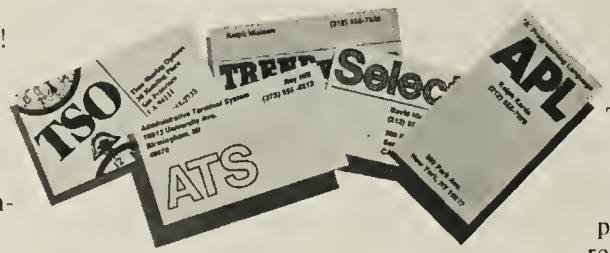

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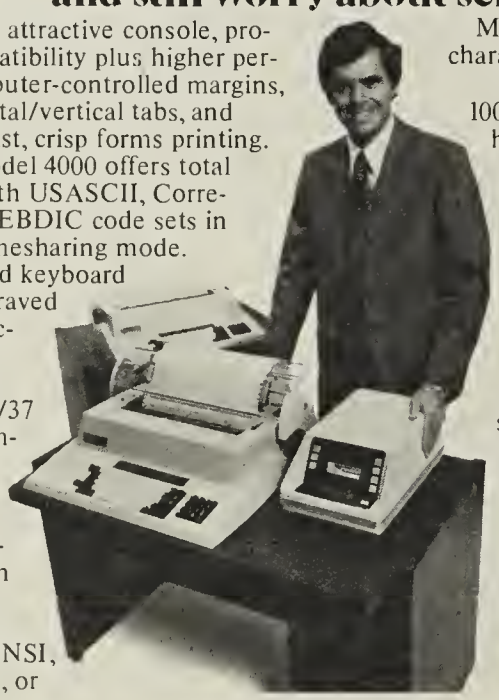

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Do DPers Write So Funny Because They're Insecure?

By Peter Martin
Special to Computerworld

"A data base is a structured collection of data which is essentially nonredundant, providing a constant logical view of that data under a wide variety of physical realizations, thereby providing a high degree of data independence."

Believe it or not, that statement is on the level. It is from a paper written by a respected consultant in the computer field.

"A data base is a synchronously maintained nonredundant collection of interrelated data items processable by one or more applications" is IBM's simplified explanation. It doesn't take a Fog Index calculation to see this passage is difficult or impossible for most people to comprehend.

"IMS is a control program designed to facilitate the implementation of medium to larger scale data bases in a multiapplication environment."

This definition of IMS occurs and reoccurs throughout the IMS literature almost as if each subsequent author, unable to resist the appeal of such an impressive passage, had inserted it boldly into his own peice.

These are just three examples of overblown writing from my file of many hundreds of such passages from writings by people in the computer field. One is tempted to ask: Why do computer people write so funny?

Not Unlike High Schoolers

Some insight into this question might be gained by noticing many of the style characteristics of computer writers are also shared by high school students in their compositions. The use of impressive, usually large, words is a hallmark of both groups.

So is the inclusion of totally nonfunctional words and phrases to dress up otherwise plain statements. For example, in the definition of IMS already quoted, what function do the words "is designed to" play?

Writers in the computer field and high schools alike rely heavily on the noun form in preference to verb constructions. (The name for this is "nominalization.")

"To assure *the successful implementation of* data base systems the Data Base Administrator will be a *focal point* for information *dissemination* and *collection*" – the writer here has gone out of his way to avoid using "implement," "disseminate" and "collect" in favor of their more elaborate noun counterparts.

Another hallmark of writers who want to sound impressive is their use of nouns as modifiers for other nouns. (These are called "noun adjuncts.") In the passage above, "data base" is used as an adjective, as in "data base systems."

This technique makes the passage sound more impressive, but also makes it more difficult to read since the reader is constantly miscued and must mentally backtrack to revamp his interpretation.

DPers Insecure

All this leads me to suspect that, at least when writing, computer people are somewhat insecure and overly anxious to impress. Most readers would probably agree insecurity and/or immaturity is a prime determinant of high school writing style, and I think the same explanation might be applied equally well to computer literature of the same ilk.

The computer people who produce much of what passes for "documenation" tend to be on the young side. They are anxious to impress in everything they do. They are impressed with themselves for being in the computer field.

A natural result of this is a tendency to dress up whatever they write. Determined practitioners can even learn to speak using the same rhetorical constructions.

Secondly, the computer field itself is still on the young side and still striving for acceptance by the "big boys," their clients in the world of business. There is still a great deal of talk about "professionalism" in computer programming, an obvious sign of a desire for acceptance.

So it is not surprising that much of what I call "computer illiterature" shows signs of immaturity. The problem is that this same attempt to impress is beginning to have the opposite effect.

Users are beginning to see that a computer system they can't understand is valueless to them, and many business people, having been burned in the past, are increasingly unwilling to spend more money for systems they can't use or comprehend.

Today the computer industry is undergoing its own credibility crisis. The "Emperor's New Clothes" effect is beginning to be seen. Business users, tired of being told they were just too unworthy (or untechnical) to understand, are starting to question whether the fault might not lie outside themselves.

Eventually users, by insisting on clear communication with their computer counterparts, might just be able to force the computer people to drop their razzle-dazzle and explain what they have to say simply, in the user's own terms. (It is significant that computer people so often insist their users learn computerese in order to understand the new system, rather than taking the effort to describe the system in the user's language.)

A secondary effect of poor writing practices on the part of computer people is that they often confuse each other. An IBM Assembly language programmer's guide tells the reader: "The Data Control Block may be completed at OPEN time."

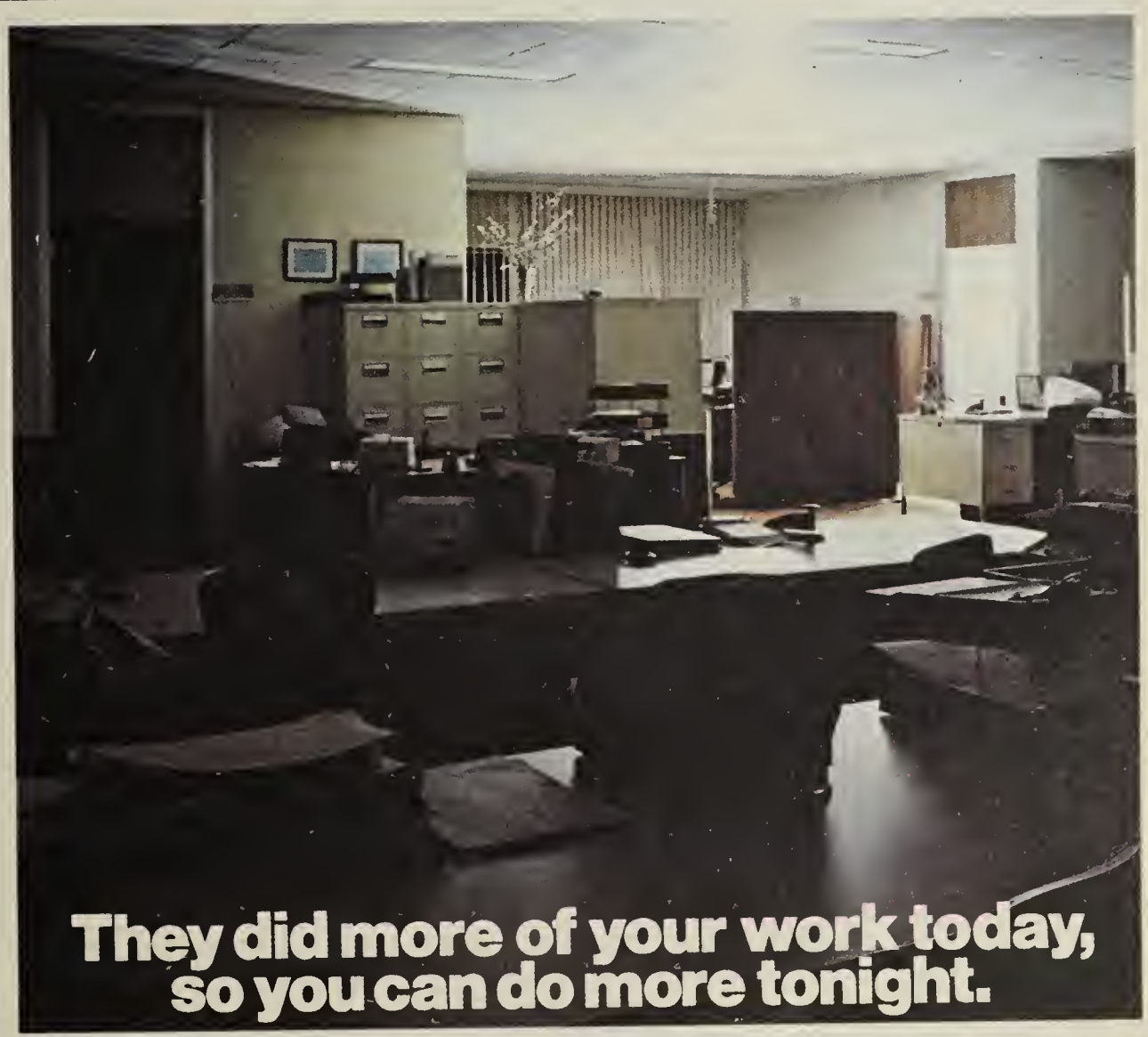
This could be interpreted to mean that sometimes it is, but on the other hand, it may not. At any rate, *who* completes it? The operating system or the programmer?

The computer field understandably attracts mechanists, not humanists, and mechanists tend to be more interested in communicating with machines than with people. But computers are used by and paid for by people.

If the computer technologists want acceptance as professionals, they had better spend less energy impressing the outside world, and each other, with how complex everything is and start clarifying and simplifying.

Martin is a communications advisor at Exxon Corp. in Florham Park, N.J.

Reader Commentary



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Letters to The Editor

User Feelings About NCR Rated Low in '73 Survey

I have followed with great interest the debate regarding how users feel regarding NCR's computer systems.

Several years ago, a survey was conducted by *Datamation* [Sept., 1973] on how users felt regarding the top eight mainframe vendors: namely, IBM, Univac, Burroughs Corp., Honeywell Information Systems, NCR, Digital Equipment Corp., Control Data Corp. and RCA.

It is interesting to note that NCR was consistently ranked last or near last by users in the following categories: product performance, support, product reliability, lives up to claims and most ethical.

This survey, although several years old, should at least give one a rough idea on how users felt about NCR's capabilities in the past.

In the interst of stimulating additional debate on this interesting subject, I would like to pose the following question to your readers:

"What outstanding and innovative accomplishments has NCR offered to push the state of the art of computer mainframes?"

I honestly can't think of any that have set the DP world on fire.

A. Yakabofski

Chicago, Ill.

More DP for the Dogs

The article, "DP Helps Find Lost Dogs" [CW, Nov. 19], described a system created by Thomas C. Corkery, canine control coordinator of Middlesex County in Massachusetts, whereby the names of dog owners, license numbers, descriptions, etc., were computerized.

We too have such a system which produces a printout of this data. The Town Clerk's Office, where the licenses are issued, receives a copy as do the Police Department and the dog warden.

When a dog is found, one of us is called and the name of the owner is located almost immediately.

June is the renewal date for all licenses in Connecticut and, at that time, bills in quadruplicate are printed from our list. One of the copies is mailed to the dog owner, which serves as a reminder notice as well as a means to renew by mail.

Sometime in July, we compile a list of who purchased licenses and who didn't and then we know exactly who is delinquent. Owners are also asked to send back renewal notices if they no longer have the dog.

Therese C. Leary
Town Clerk

Ridgefield, Conn.

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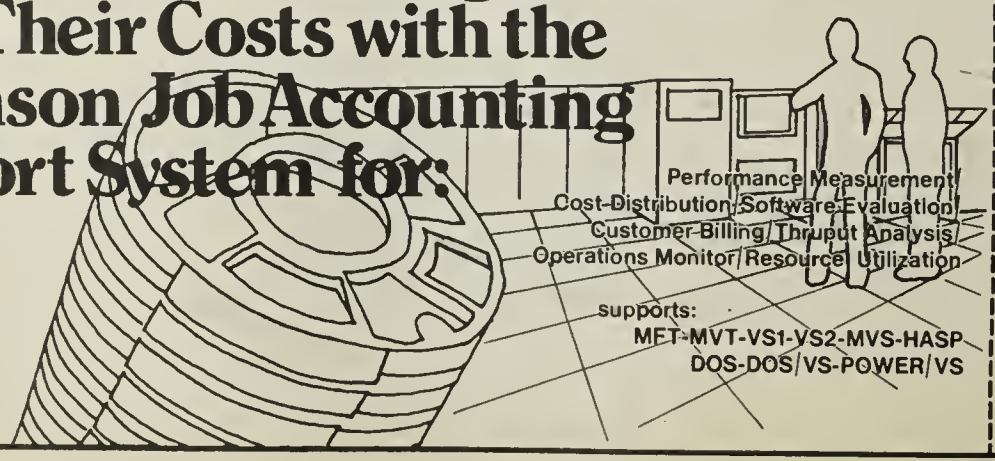

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To Let the End User Work

Census Bureau Adds Front Ends to Graphics Package

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Many installations have been working to put the design, coding and creation of one-time or specialized reports within the responsibility of the end-user departments. Perhaps nowhere has this been done more graphically than at the U.S. Census Bureau.

The bureau is now making professional-grade graphics and charts in a fraction of the time previously required.

Bar charts, trend graphs and pie charts are available to the entire bureau in minutes, according to Larry Cornish, chief of the graphics software branch of the bureau's DP operations.

Nontechnical personnel such as the clerical staff can sit down at a terminal, give English-language commands and immediately get the output that is wanted, in color and in a variety of media if desired.

To make this approach work – "We've been putting together this 'frame of mind' over the past two years," Cornish noted – the bureau acquired a software package that would function well with its Univac 1108 and 1110 mainframes, then built a series of front ends to make the system more approachable by the non-DP trained.

The software package Cornish chose was Dissipla from Integrated Software Systems Corp. in San Diego. The bureau acquired it in May and four of Cornish's staff spent "about three months each" creating application-oriented front ends and two different ways of utilizing them.

User Selects Output

The front ends allow users to select either bar charts, pie charts, time series plots or map contours as their desired output and to describe what the output should look like in graphic images rather than in typically cryptic computer command parameters, Cornish said.

The user, working the key words, can tell how many bars are wanted, how they are to be grouped, how many segments are in each and what style of shading is desired.

While inputting key words and their values has proven effective for many of the Census Bureau statisticians, Cornish and his crew also developed an interactive entry facility as well. With this support, the user is coached through the input process.

The bureau's preprocessors convert the user-oriented input into parameters read by Dissipla. This in turn can produce the desired output on any plotter, graphics display or computer-output-microfilm (COM) device at the bureau.

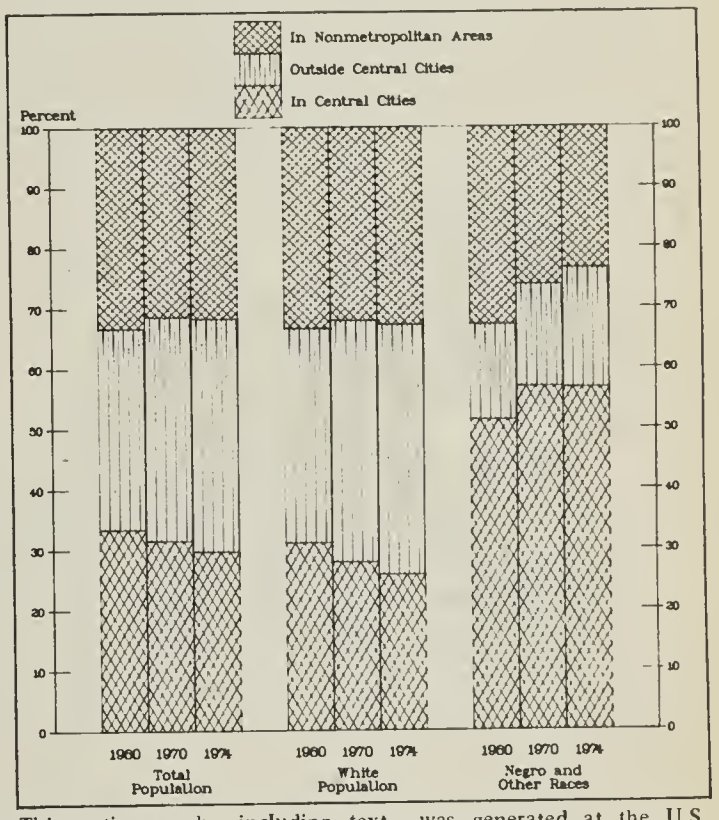
Currently the bureau has Tektronix and Digital Equipment Corp. GT-40 display scopes, a Xynetics flatbed plotter and an FR-80 COM unit from Information International, Inc.

Typically, users route their output to a CRT for checking before sending it to one of the hard-copy peripherals.

The Dissipla preprocessor programs were written in Fortran and Nualgol, the Univac-sponsored version of Algol developed at Norwegian University.

Dissipla itself is a series of 355 Fortran subroutines that comprise a library of plotting capabilities, including U.S. and world mapping, arbitrary viewing for 3-D plots and a choice of various interpolations and smoothing for plotted curves, as well as simple bars and pie charting.

One of the features Cornish found particularly appealing was the package's default options. The user is free to let the system choose the shading, for example, but the user may override the given choices at any time.



This entire graph – including text – was generated at the U.S. Census Bureau using Dissipla and a Xynetics flatbed plotter. The bar segments are produced in different colors as well as different shadings, a spokesman noted.

Personnel System Meets U.S. Demands

ATLANTA – The Personnel Management and Reporting System (PMRS) now available from Management Science America, Inc. (MSA) is one of a growing number of packages designed to aid users in meeting the range of government-required reports on employment, personnel and working conditions.

With a base package and a choice of add-on machines, the user can produce the documentation required by the Equal Employment Opportunity Commission (EEOC), the Employee Retirement Income Security Act (Erisa) and the Occupational Safety and Health Administration (Osha), MSA said.

Beyond that, a spokesman added, PMRS supports Affirmative Action reporting and both predefined and user-formatted management reports.

Coded in ANS Cobol

The package is coded in ANS Cobol so it can be utilized across a range of mainframes. And it has been designed to run on a 128K-byte machine so its capabilities are available to modestly sized installations, MSA said.

The basic $15,000 PMRS provides standard EEOC reports; a skills inventory facility; three management-type "profiles" of personal, educational and salary and job-review information; and various other fixed and custom-designed reports. A Special Report Generator is also there, the spokesman added.

Erisa, Osha and the other specialized reporting modules are separately priced in the $3,000 to $6,000 range. The complete PMRS could run to $55,000, MSA said.

Because the maintenance effort required with this type of software could be significant, depending as it must on changes in government regulations, support for that type of updating, as well as correcting any program errors during the first year is included in the package price.

Maintenance contracts are available beyond that time, MSA noted from 3445 Peachtree Road N.E., Atlanta, Ga. 30362.

MASsive Manual Free

TOWSON, Md. – The concept behind Martin Marietta Data System's Modular Application Systems (MAS) and extensive details about each of the modules are described in a free 125-page manual on the systems from the vendor at 300 East Joppa Road, Towson, Md. 21204.

Basic Business Language Moved to TSO

WAKEFIELD, Mass. – Basic Business Language (BBL), developed and still owned by Core & Code, Inc., Wellesley, Mass., is now available for the IBM TSO environment from Sofco Inc.

BBL enables financial managers to control and systematize both long- and short-term planning functions. Capabilities built into the package are said to include support for present value, return-on-investment, regression analysis and statistical techniques.

The English-like language was developed initially for the Digital Equipment Corp. Decsystem-10 environment. The current version is a "rewrite and a restructuring" which enables it to run efficiently under TSO, Sofco said.

In its new setting, BBL makes TSO essentially transparent to the technically competent but non-DP-oriented end user, the vendor claimed. Detailed operations required by TSO but unrelated to the end user's area of expertise are handled by BBL without user intervention, Sofco said.

Although BBL is derived from Basic, it represents a "substantial" upgrade from that language in terms of the business problems it is designed to solve; at least one user has replaced IBM's Basic with BBL as a result of comparative evaluations, according to the vendor.

BBL for the TSO environment is available for $900/mo; the earlier Decsystem-10 version rents for $600/mo.

Sofco is at 4 Lakeside Office Park, Wakefield, Mass. 01880.

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Revised Cobol JOD Available

OTTAWA – An updated version of the Cobol Journal of Development (JOD), with approved specifications as of Jan. 1, has been published by the Codasyl Programming Language Committee (PLC), the group responsible for development of the language.

The new JOD, like the one published in 1973, is available from the Canadian government's Department of Supply and Services. Future page changes as PLC continues its work will be available on a subscription basis.

Technically, the specifications in the JOD make up the formal definition of Cobol. The American National Standards Institute (Ansi) specifications for Cobol are in fact a subset of the JOD definition in effect at the time the Ansi standard was promulgated.

Thus, JOD is "ahead" of the Ansi specifications by several years. Some elements of the language as defined by PLC may never become part of the compilers available to most installations.

But the JOD could be "extremely helpful" to compiler builders who want to go further than Ansi, but stay within Cobol.

In addition, the journal – and its page changes – could be helpful in classes studying the growth of computer languages, PLC suggested.

The JOD by itself costs $7.50. The subscription service, providing the initial JOD and the page changes, is $20/set. Remittance in U.S. or Canadian funds payable to the Receiver General of Canada must accompany orders.

They should be sent to the Department of Supply and Services, Materiel Data Management Branch, 88 Metcalfe St., Ottawa, Ontario, Canada K1A 0S5.

Network Programs, Data Bases To Be Listed in 150-Page Guide

PHILADELPHIA – A 150-page loose-leaf guide to conversational application programs and data bases accessible on interactive terminals linked to remote-computing networks is being prepared by Gregory Research Associates here for spring publication.

"Remotely Accessible Conversational Programs and Data Bases" (RCPD) is expected to list specification on about 2,000 programs available on networks through their own public libraries or through royalty or other arrangements with independent developers.

The publisher, Tom Gregory, has accumulated data about many such programs but he is seeking contact with vendors or developers before the initial printing so RCPD "can immediately be as useful as possible."

The real value of such a guide, he said, will rest on its ability to show users what software is already available, saving them the time and effort needed to create their own.

Broad areas such as civil engineering, data management, finance, insurance and statistical analysis will be indexed. Within each indexed category, programs and data bases for specific applications will be grouped together, he said.

Under each program name will be a description, Gregory said, with information on accessibility and availability; special features; vendor or support agency; and cost data, including one-time setup charges, if applicable, and availability of toll-free calling into the network.

To encourage participation and cooperation, the publisher noted vendors and support agencies will not be charged for any listings. They are welcome to send all the information required to have their products "intelligently listed and updated."

RCPD will be sold through the mail with the first three bimonthly updates included in the $28 subscription price. Gregory Research is at 1900 Greymount St., Philadelphia, Pa. 19116.

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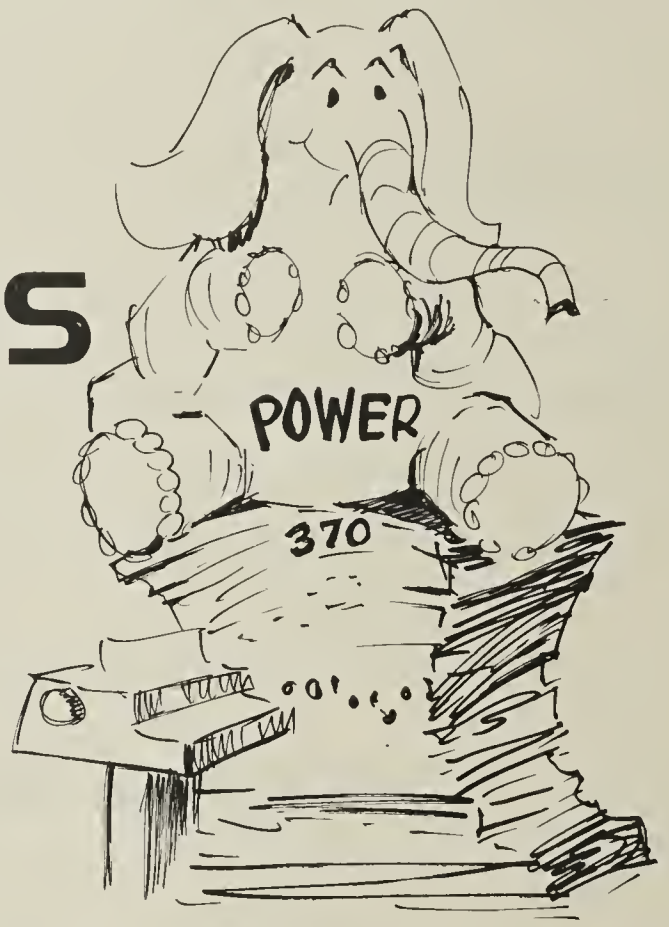

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Multiterminal Usage Backed on GA Minis

CHICAGO – A multiterminal, event-driven operating system for General Automation (GA) SPC-16 series computers, TSOS-16 from Applied Digital Technology, Inc. (Adtech) is said to make resources available to as many as 64 terminals, giving each a batch-like capacity.

Developed by Adtech for its own use as a systems house, TSOS-16 allows multiple users to create, test, modify and execute programs as if the system were dedicated to them, a spokesman explained.

The system operates on a round-robin priority basis, allowing each user to get as much service as any other. All real-time considerations have been eliminated and the user creating or modifying a program, for example, can concentrate on application logic without worrying about interfacing with the system, he added.

TSOS-16 has what the vendor described as a "powerful command structure" with a terminal and console executive.

Designed to be fully compatible with GA's software, the Adtech package can be acquired for $3,000 from 8550 W. Bryn Mawr Ave., Chicago, Ill. 60631.

Rolm 1664 Gets Fortran

CUPERTINO, Calif. – Said to perform as well or better than the compilers available on most commercial computers, a Fotran compiler will be ready for use on the Rolm Corp. 1664 minicomputer this summer, according to the vendor.

The software will enable programmers to write code that uses the full 128K-byte address space as well as "significantly" increasing program execution speeds, a Rolm spokesman said.

Program optimization is achieved by minimizing overhead normally occurring in subroutine linkage, he added.

With the potential for addressing and using all of memory, user's floating-point operations, for example, are performed with in-line code, thus fully utilizing the 1664's parallel floating-point processor, the spokesman said.

The Rolm Fortran compiler will operate under Data General Corp.'s RDOS environment on Nova and Eclipse minis, he added.

Rolm Corp. is at 18922 Forge Drive, Cupertino, Calif. 95014.

Outline Form of Structure Rules Provides Essentials

By Perry Babcock
Special to Computerworld

The following guidelines for writing structured programs in Cobol are based mainly on the book *Techniques of Program Structure and Design* written by Ed Yourdon and published by Prentice-Hall.

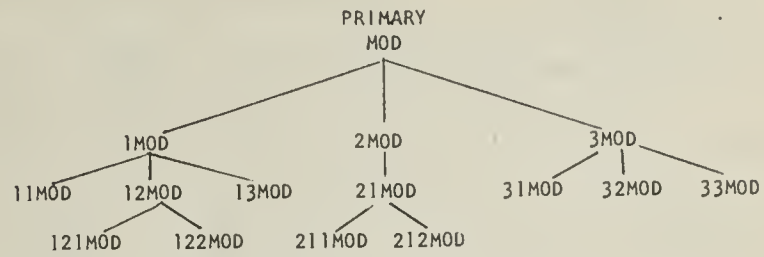
Concepts and Techniques

This book was in manuscript form when I read it one year ago. Yourdon covered a good deal more than the points made in these guidelines, but I have found this summary of his ideas very useful in my own programming:

A. Three logical mechanisms will be permitted:
   1. Simple sequential execution.
      a. Code only one verb on each line.
   2. Loop mechanism (PERFORM UNTIL) with nesting permitted.
   3. IF . . . THEN . . . ELSE . . . mechanism with nesting permitted.
      a. Indent after each IF statement.
      b. Indent after each ELSE statement.
      c. The ELSE statement should appear on a line by itself in the same column as its corresponding IF.
      d. Each level of nesting should be clearly indented.

B. GOTO Statements:
   1. GOTO DEPENDING ON can be used if each paragraph in this mechanism transfers control to a common exit point as its final step.
   2. The only place a standard GOTO statement can go is to the exit paragraph for the module in which it is coded (see C.1.a. below).

C. Programs should consist of distinct modules, each of which performs a specific function.
   1. Each module must have only one entry and only one exit.
      a. Each module should have two paragraph names, one at the beginning and one at the end of the module. The only statement allowed after the last paragraph name will be EXIT.
   2. Each module should have length of no more than 50 statements.
   3. Each module must be independent of every other module.
      a. A module may use another module's working storage in its calculations, but cannot alter another module's working storage.
      b. No module can be altered by another module, i.e., use of the ALTER statement is prohibited.
   4. In order to facilitate module independence and to easily identify module hierarchy, the following module numbering system should be used:
      a. The highest level module (most major) will be known as the primary module and will not have a prefix.
      b. Next highest level modules will have a one-digit number prefix.
      c. Modules at the third level of control will have a two-digit number prefix and so forth for lower level modules.
      d. When a module is coded, its number will be determined by putting a one-digit number onto the low order position of the number of the module which performs it. If this system is used, the module hierarchy can be easily traced. The accompanying diagram of module hierarchy uses this system.
   5. Data names in working storage will be prefixed by the number of the module which sets them or alters them.
   6. Compiler listing control.
      a. Use the EJECT statement to skip to a new page before large modules.
      b. If the modules are small, put more than one on a page. Use the SKIP 2 statement to separate modules which appear on the same page.
      c. A and b above apply to the procedure division and the working storage section of the data division.
   7. Programs should be coded in "top-down" fashion.
      a. Major functions (modules) should be coded first.
      b. Lower level functions should be coded after more major functions have been coded.
      c. It is permissible to code modules all the way down one leg of the hierarchical tree before coding all of the modules at each of the levels. In other words, it it permissible to code modules in this order: 1MOD, 11MOD, 112MOD, 1121MOD.



Straight-line program structure is emphasized by linked module designations.

Babcock is senior programmer at The Data Corp. in Los Angeles.

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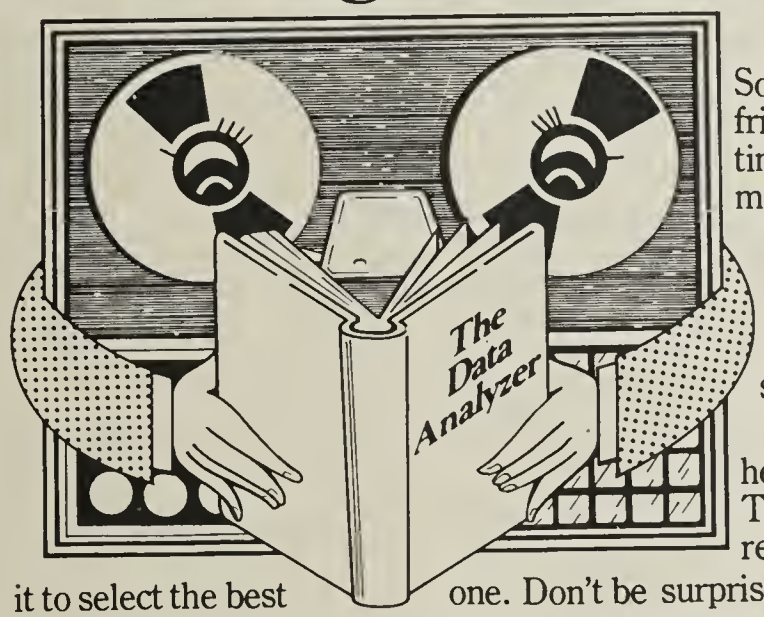

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Nonunique Names No Good

Restructuring Best Hope for Clarity

By Arne Rohde
Special to Computerworld

I fail to see how William B. Simmons idea of using nonunique paragraph names [CW, Jan. 26] can achieve anything in the way of program clarity.

Concepts and Techniques

What I can see is that the example he used to illustrate his point can be restructured to improve its clarity considerably.

In doing so, however, one meets a case where an in-line PERFORM (or DO) would be a desirable feature. Lacking this, it is necessary to set up a separate paragraph within the performed section, which is only performed from within the section itself.

A by-product of the restructuring is a considerably improved efficiency, but this can be considered of secondary importance to the clarity unless this is a routine which consumes a large amount of processing time.

In Simmons' example, the least probable case, namely the error case of a negative argument, was the one tested and handled first. The reader of the program would thus have to read and bypass this coding to find what he is looking for.

It would be more considerate to handle the most common case first, if only because this is the one the reader is most likely to be interested in (besides being more efficient).

The next case handled by Simmons was the special case of 0 to 1; again, the reader is not likely to be interested.

Heart of the Matter

And finally we get to the heart of the matter, the general case for arguments with value greater than 1.

If we look at the loop for the general case, we see the factorial is found by multiplying all integers less than the argument itself, including 1. Most people realize there isn't much point in multiplying by 1, since this leaves the result unchanged.

In other words, we can reduce the number of iterations by one for each factorial to be calculated, and this is not necessarily insignificant.

It was also stated in the example that all data fields are eight-digit integers, but no check was made for argument-overflow error.

The largest argument which will give a valid result is 11, and this should be checked for as well as negative arguments. Larger arguments will result in factorials with more than eight digits.

Restructured Calculations

Now we can try restructuring the calculation by taking the most usual case first and using one of the facilities available in most Cobol compilers, namely the PERFORM . . . UNTIL.

There are at least two distinct methods available here, one using the VARYING option as well, the other using explicit incrementing or decrementing of the loop control argument.

The choice between the two would be a matter of personal taste. One possibility is as follows:

```
CALC-FACTORIAL SECTION.
  MOVE ARGUMENT TO FACTORIAL.
  IF ARGUMENT 0 > AND < 12
    PERFORM LOOP VARYING WORK-
    MULT FROM 2 by 1 UNTIL MULT-WORK
    NOT < ARGUMENT;
    ELSE IF ARGUMENT ZERO MOVE 1 TO
    FACTORIAL;
      ELSE PERFORM ARG-ERROR
        MOVE ZERO TO FACTORIAL.
    GO TO END-SECT.
  LOOP.
    MULTIPLY FACTORIAL BY WORK-
    MULT.
  END-SECT.
    EXIT.
```

This assumes the UNTIL condition is tested before the PERFORM is executed, that is for ARGUMENT = 1 or 2, LOOP will not be executed.

For those who do not like the idea of incrementing the multiplier or do not want to let Cobol vary the loop control, the following version is available:

```
CALC-FACTORIAL SECTION.
  MOVE ARGUMENT TO FACTORIAL,
  WORK-MULT.
  SUBTRACT 1 FROM WORK-MULT.
  IF ARGUMENT > ZERO AND < 12
    PERFORM LOOP UNTIL WORK-MULT <
    2
  ELSE IF ARGUMENT ZERO MOVE 1 TO
  FACTORIAL
    ELSE PERFORM ARG-ERROR
      MOVE ZERO TO FACTORIAL.
  GO TO END-SECT.
LOOP.
  MULTIPLY FACTORIAL BY WORK-
  MULT.
  SUBTRACT 1 FROM WORK-MULT.
END-SECT.
  EXIT.
```

To me, both these versions are easier to read than Simmons' original. They contain considerably fewer statements, including GOTOs (one GOTO which is not really necessary, as opposed to three in the original).

The coding could have been simplified even more if Cobol had had an in-line PERFORM facility.

Rohde is on the DP staff of Bang & Olufsen A/S in Struer, Denmark.

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Optimizer, Plan IV Available in UK

LONDON – Concurrent with its establishment of a System Efficiency Division, Gemini Ltd. has acquired the UK marketing rights for both Plan IV and Optimizer II from Capex Corp. of Phoenix, Ariz.

The Optimizer package enhances the operation of a user's Cobol object program by interpreting its logic flow and eliminating all unneeded compiler-generated code.

The net effect of an Optimizer analysis and recoding run may be a saving of 20% in CPU time, 20% in memory requirement, up to 50% of procedural instructions dropped and reductions in paging rates on VS systems, Gemini claimed.

Plan IV, a management tool for planning and controlling computer resources, provides more than 50 different reports.

Gemini Ltd. is at 84 Baker St., London W1, England.

Project Management Seminars

International Systems is proud to announce its Spring 1976 Schedule of Public Presentations of its PAC II System for Project Management. These half day presentations are free of charge to those interested in seeing the latest and most comprehensive software system available today to assist you in your project planning and project monitoring needs. International Systems' experience covers seven years in the automated project management field and includes more than four hundred users.

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Report Findings Indicate

Switched Digital Services Provide Savings to Users

By Ronald A. Frank
Of the CW Staff

RAMSEY, N.J. – Switched digital carrier services can offer data communications users substantial savings compared with more conventional services.

This is the finding of a study on dedicated digital networks issued by the Center for Communications Management, Inc. The report covers both private-line and switched digital services, with the latter category limited to Data Transmission Co.'s (Datran) Datadial Service and the packet-switched service available from Telenet Communications Corp.

The digital data offerings of the communications common carriers represent a significant savings over traditional services, mainly because of the improved utilization of the frequency spectrum for the movement of digital information, the report said.

"Robust competitive and regulatory struggles will continue among the established and specialized communications common carriers for many years," the report predicted.

Regardless of the outcome, the user will benefit because of an expected 50% reduction in rates over 1973 private-line charges, improved transmission quality, lower equipment cost because of the elimination of modems on all-digital links and carrier policies which encourage shared use and resale of lines in hybrid services, the report said.

In many applications, the cost of remote terminal equipment may be reduced because extensive error detection and correction will not be required. This will be because of the increased reliability of digital links.

One of the problems users have had is making a comparison between analog and digital services to evaluate costs. The report addresses this problem by providing a comparison of "1,000 character blocks per $1 of usage charge." (See chart.)

Service	100 Miles	300 Miles	800 Miles	1,500 Miles
Western Union TWX	3.4	2	1.3	1
AT&T Wats	25	23	21	20
Telenet Communications Corp Telenet	155	155	155	155
Data Transmission Co.'s Datadial	1,745	582	218	116

The chart above compares the throughput costs of 1,000 charaeter blocks per $1 of usage eharge. All of the serviees are distance (mileage) sensitive tariffs exeept for Telenet, whieh charges on the basis of 1,000-packets of information transmitted.

The comparison includes only long-haul rates and does not include call set-ups, system overhead, network access or terminal equipment costs. Nevertheless, it indicates a significant cost reduction, based on throughput, for the switched digital services.

In addition to the switched digital offerings, the report covers AT&T's Dataphone Digital Service; Dataline, offered by Datran; Western Union's Multipoint Data Service; the Trans-Canada Telephone System's Dataroute; and packet-switched networks being planned or operating in other countries.

Also included is a review of the International Digital Data Service being planned by Western Union International.

The report contains available tariffs including rates in effect at the time of publication.

The complete report on dedicated digital networks is available for $75 from the company at Box 324, Ramsey, N.J. 07446.

Comten Front Ends Replace IBM Models

ST. PAUL, Minn. – The Comten, Inc. 3650-II and 3670-II offer the IBM user a front-end communication system designed to replace the IBM 3705-I and 3705-II in IBM 360/370 data communications networks, the vendor said. The Comten 3650-II and 3670-II front-end systems will handle individual lines up to 230,400 bit/sec and provide aggregate data throughput as high as 100,000 char./sec, the firm said.

Line control hardware handles the latest line protocols and can simultaneously serve to Model II processors, Comten added.

The 3650-II and 3670-II offer the operational features of the earlier Comten 3650 and 3670 (now designated 3650-I and 3670-I) which have been available since 1972. Both Model II systems offer 650 nsec cycle time semiconductor storage with error checking and correction.

The 3650-II can terminate up to 128 lines in any combination of protocols and can simultaneously support two IBM host processors.

The basic Comten 3650-II contains 32K bytes of storage expandable to a maximum of 256K bytes in 32K-byte increments. The Comten 3670-II can terminate up to 384 lines in any combination of protocols and can simultaneously support up to four IBM host processors. The basic 3670-II contains 64K bytes of storage expandable in 32K-byte increments to 512K bytes.

Both Comten systems feature a communication line interface and control module which handles a wide variety of devices in asynchronous and synchronous modes, including those operating under Binary Synchronous Communications (BSC) and Synchronous Data Link Control (SDLC) protocols.

The Data Link Control-Modem Interface Module (DLC-MIM) handles up to 16 lines and permits line switching and line sharing between two Comten processors.

The 3650-II and 3670-II are compatible with the IBM 3704/3705 in either emulation or NCP mode, and do not require changes in host application or teleprocessing software.

Support for all IBM standard terminals and a large number of non-IBM terminals is provided. Console support is offered for network control and monitoring functions.

Comten also offers the Communication Networking System (CNS) software system which allow the Model II front-end processors and remote concentrators to work together to provide a network capability featuring performance, flexibility and transparency to the user, the firm said.

The features will be available for currently installed 3650-I and 3670-I models, which are field upgradeable.

The 3650-II and 3670-II can operate with unmodified host software which supports IBM 270X and 370X equipment even with non-IBM terminals and protocols, Comten said. It handles local or remote terminals over various carrier or in-house facilities as a front-end or a remote communications processor.

The 3650-II is available in eight models, and options include an IBM channel program loader, IBM channel interface adapter and an emulator identifier for the detection of 270X control codes.

The processors handle various half-duplex and full-duplex protocols at standard transmission speeds. Interfaces are available for operation with Bell wideband service and Bell Dataphone Digital Service.

First customer shipments of Model IIs will begin in the first quarter. Deliveries of systems with semiconductor storage and DLC-MIMs will begin in the third quarter.

The Comten 3650-II systems lease prices start at $1,200/mo on the extended term plan, with purchase prices starting at $50,000. The Comten 3670-II system lease prices start at $2,400/mo with purchase prices starting at $100,000. Comten is at 1950 West County Road, St. Paul, Minn. 55113.

Unit Monitors Response Time

SALT LAKE CITY, Utah – Questronics, Inc. has introduced a hardware monitor said to be designed specifically for measuring the performance of interactive terminals.

The Terminal Response Time Monitor (TRTM) can measure the response time of each transaction performed by a terminal and compute the average of these times, the company said.

It will also retain the maximum and minimum response times which have occurred, Questronics added.

The monitor uses an optical coupler system for attachment that does not require internal connections to the terminal. This feature eliminates locating the proper probe points within the terminal, the company said.

The optical coupler uses a photocell that is placed on the system to inhibit light and can be attached to any CRT terminal that has an inhibit spot or light.

The monitor measures the time the inhibit light is on and counts it as one transaction; this transaction time is added to the total transaction time to that point. TRTM then recomputes a new average and checks to see if the current transaction is a new minimum or maximum, the company said.

Unattended operation of the unit is under control of a dedicated microprocessor within the monitor and the response time information is displayed on a four-digit LED display, it said.

The average, minimum, maximum and number of transactions are selected by a front-panel switch located on the TRTM.

The TRTM can also be used for any device which has a light that turns on when in use, Questronics said.

Applications such as Wats line usage and modem operation can also be monitored using TRTM, the company said.

The monitor is priced at $950 from Questronics at 3596 South 300 West, Salt Lake City, Utah 84115.

The new 30 cps Terminal from AJ

Here's the *brand new* AJ 830, a 30 cps impact printer terminal that utilizes AJ's microprocessor control and the innovative "daisy" print wheel. The AJ 830 is ideal for interactive time sharing, information entry and retrieval, and point-to-point data exchange.

Some of the features of this great new terminal include:
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- Plotting and APL

You also can get options such as forms tractors, pin-feed platens, and fan-fold paper shelves. There's even a 45 cps printer available for greater throughput.

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Also Increases Productivity

Service Net Helps Telephone Company Reduce Errors

By John P. Hebert
Of the CW Staff

DENVER – A computerized service order-processing network with about 200 intelligent display terminals is helping Mountain Bell reduce clerical errors, increase productivity and provide more efficient customer service to its more than six million users.

The Teleprocessing Information Gathering, Editing and Routing (Tiger) system provides offices throughout an eight-state area with on-line access to central computers which reject service orders containing input errors, Mountain Bell said.

Sanders Data Systems' 810 systems, which are programmable, replaced earlier Sanders 720 paper tape systems in four Rocky Mountain states and part of Texas by February 1975 and have reduced from 20 to 16 the number of terminals per order center while increasing productivity by over 27%, according to Marge McCool, staff administrator of Corporate Customer Services of Mountain Bell.

Mountain Bell also implemented the Tiger system in April 1974 in three states which previously had no automated system to service orders. The system was operational on July 1, 1974, which left enough time for operators to learn how to use the intelligent terminals, McCool said.

At present, the system is used to enter completed service orders into Mountain Bell's accounting system. Paper copies of the orders are typed into the system via the Sanders 810 CRT terminals.

Editing Time Reduced

Programmable 810 controllers handle the interface between the clusters of CRT terminals and two central computers. They also provide the format field for data entry, format editing and validation of information transmitted and received from the terminals to the central processor, Mountain Bell said.

Operating on-line, the systems enable operators to enter orders of varying length from one to 100 pages. Input errors are rejected as they are entered, resulting in a reduction of editing time from one day to a few seconds, Mountain Bell said.

The terminals transmit service order information through standard private-line data circuits provided by the telephone company, McCool said. The information passes through Bell 201C modems operating at 2,400 bit/sec.

The only problem experienced with the entire teleprocessing network occurred during the testing period, when one of the private lines did not transmit accurate information because it was not properly conditioned, McCool said.

There have been no problems with the terminals, she stated, adding Bell was involved in the system design.

A feature of the system permits terminals in the teleprocessing network to be diagnosed from central 810 terminals here and in Salt Lake City.

A Sanders field service representative transmits the diagnostic program to the remote 810 controller and, with the aid of an operator at the remote site, can perform a checkout of the terminals. This elminates unnecessary field trips and, when a service call is required, provides the technician with advanced information, Mountain Bell said.

Customer Troubles Logged

Mountain Bell also has a network of 66 Sanders 8040 stand-alone systems, each with cassettes and printers. These systems, installed throughout the eight-state region at repair service bureaus, are used to enter customer trouble reports at each site.

The information is stored on the 8040 cassettes which are polled at night; the processed information is returned the next day to the bureaus, Mountain Bell said.

The 8040 systems have eliminated the work involved with previous mark-sense card systems. In addition, they have reduced considerably the central processor costs while providing greater editing capabilities, Mountain Bell said.

The states covered by the system include Colorado, Wyoming, New Mexico, Arizona and the El Paso County area of Texas, McCool said.

The three states where no prior automated system was in operation are Utah, Idaho and Montana, she said.

TI 700 System Polls Model 742s in Nets

HOUSTON – A system designed to query disbursed networks of its Silent 700 Model 742 programmable data terminals has been introduced by Texas Instruments, Inc. (TI).

The 700 Terminal Polling System (TPS) consists of a TI 900 minicomputer with up to 64K bytes of random-access memory, a 9-track, 800- or 1,600 bit/in. tape drive and a Silent 700 Model 733 automatic send/receive terminal with dual magnetic tape cassettes, the company said.

By using up to four built-in modems and auto call units, the system can poll up to 200 Model 742 terminals over as many as four telephone lines, it said.

As an alternate configuration, the system can accommodate up to eight telephone lines with the addition of external modems and auto call units, a spokesman added.

The polling system collects and stores data in an IBM-compatible format, TI explained. Following system startup, the TPS polls and stores data on 9-track tape in a format compatible for processing by a host CPU.

In turn, resulting output from the host CPU can be redistributed automatically via the TPS to the terminal network, TI said.

Purchase price for the TPS is $37,800 and the 12-month lease rate is $1,200/mo, including maintenance. Deliveries will begin in March, TI said from P.O. Box 1444, M/S 784, Houston, Texas 77001.

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New government legislation, such as ERISA, OSHA and EEO, has created burgeoning demands for information about your

'Magic Blue Box' Helps User Keep NC Tapes Error-Free

CLEVELAND – When a company's business is precision manufacturing, its numerical control (NC) time-sharing system must produce control tapes that are 100% accurate.

But if local communications are not tailored to these needs, line interference problems can bring NC tooling to a grinding halt.

That's the situation the Kysor Machine Tool Division here faced. Kysor, a division of Kysor Industrial Corp. uses time-sharing for producing NC tapes to run its Futurmill milling cutters.

Serving aerospace and automotive customers, Kysor Machine Tool specializes in custom precision cutters for hundreds of close tolerance uses.

But the company has just two basic products – "precision and accuracy," according to Fred Iosue, plant manager of Futurmill.

"These are what we sell," Iosue said. "We give our customers an inspection certificate that certifies all our cutters to be accurate within .8 of a 1/1,000 of an inch."

Early in 1975, Futurmill engaged Comshare of Ann Arbor, Mich., to provide DP capability for on-site production of its NC tapes.

Using a 300 bit/sec terminal on a dial-up line, Kysor programmer Jack Ballard could enter the parameters of his Fortran program and a description of the part he wanted to produce. He could then monitor the printout as the remote CPU processed the instructions and tapes flowed from the terminal punch unit.

Something Wrong

That was the concept. But, by the middle of last summer, it was obvious that something was seriously wrong: errors in the tapes were occurring with frequency. Some tapes had to be processed three, four, as many as five times before a perfect run could be achieved, Iosue said.

With Futurmill's monthly requirements amounting to 25 to 35 tapes ranging from 65 ft to 250 ft each, the cost in dollars and time for reprocessing was fast becoming prohibitive, he recalled. Futurmill temporarily suspended its application and began looking for the source of the problem.

Identifying the problem proved more of a job than Kysor imagined. At first it was believed to be the result of a programming error, but Futurmill had long experience with NC parts programming, having processed its tapes manually for years before switching to time-sharing.

Vibration was also considered as a possible cause since Futurmill's terminal sits only a matter of yards from the nearest milling machine.

The terminal itself, a Western Union Data Services 30 char./sec model, was also inspected, as was its acoustic coupler unit. (Futurmill pays about $243/mo for the terminal, which has several specialized options to handle the NC tapes.) Even the company's switchboard was checked. But nothing conclusive emerged.

The theory that the trouble was in the vendor's communication's network was discounted: the network employs specially programmed minicomputers that error correct all data sent between the computer center in Ann Arbor and the many remote network cities. Besides, none of the vendor's other Cleveland clients had experinced such difficulties.

Tested Out Theory

The search then turned to the local telephone line connecting Futurmill's terminal to the vendor's remote network node in Cleveland. A high probability existed that "noise" interference on this local loop was the cause of the manufacturing company's control tape errors.

To test this theory, Comshare proposed installing a device it designed to extend error-control capabilities from the CPU to asynchronous user terminals. About the size of a shoebox, the Telegrid Error Controller (TEC) was installed between the user's asynchronous terminal and his coupler.

The TEC's function is to check error-control information added to output data by the central mainframe. If the error check shows a discrepancy, the TEC requests retransmission of the data. No data is output to the terminal until it successfully passes this error check.

The concept is fairly straightforward, but until now, according to Isoue, no such device had existed to help deal with the impact of local line interference on low-speed terminal output.

The alternative – procuring dedicated FX and specially conditioned local telephone lines – was expensive and still could not guarantee error-free output. Switching vendors was not the answer since Kysor had previously tried another time-sharing service and experienced similar error levels.

Installation of what Futurmill's plant manager now refers to as the "magic blue box" took place early last October. Since that time Futurmill has produced NC tapes without a single error "100% of the time," Iosue said. It costs about $6.50 to create a tape, Iosue said.

"Before installing the controller," Iosue said, "we had to sit at the terminal watching every line that was printed. When we caught an error, I would say to myself, 'Well, there's another tape down the drain,' and we would have to stop, restart and retype all the input.

"Now it's a good feeling to know that all you have to do is type the input once, and away you go."

Futurmill is currently leasing the TEC unit at $50/mo. Should the firm decide to purchase the unit, it can apply 50% of paid rentals to the price of $1,500.

The user pays Comshare about $700/mo, of which $150/mo is for CPU time. The TEC unit has resulted in a 25% savings in monthly charges, Iosue estimated.

Futurmill uses the Comshare Xerox Sigma 9 in Ann Arbor, which runs with the Commander II software system.

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CSMA Plans DAA Study

SHALIMAR, Fla. – The Communications Systems Management Association (CSMA) will conduct a study in May called "DAA Elimination and Its Effects on Communications Systems."

The study will include areas of system throughput and redesign; changes in communications facilities requirements; and software and component redesign, CSMA said.

Additional information is available from SCMA at Box 556, Shalimar, Fla. 32579.

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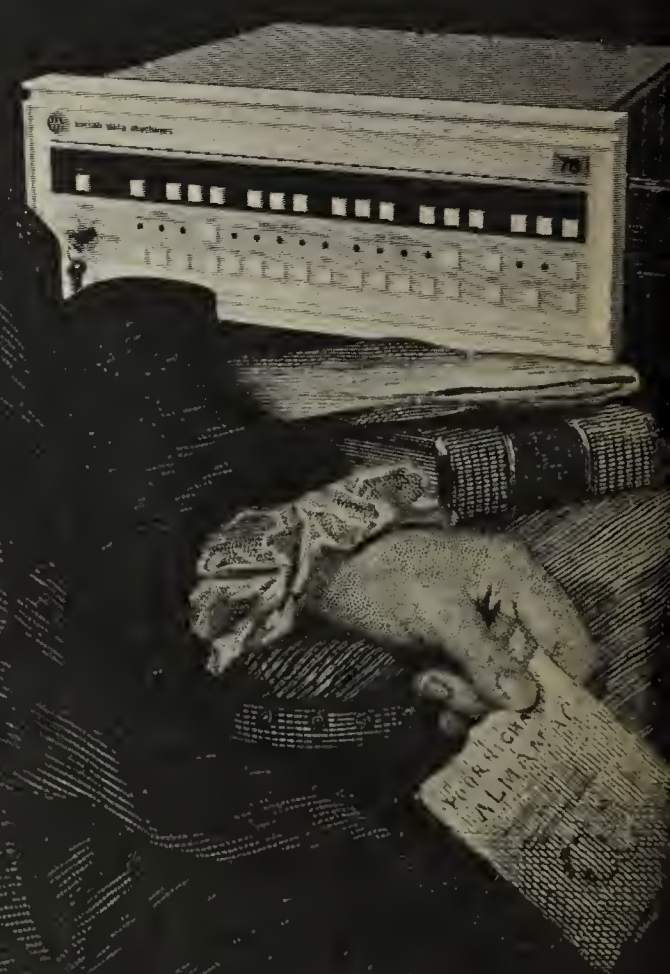

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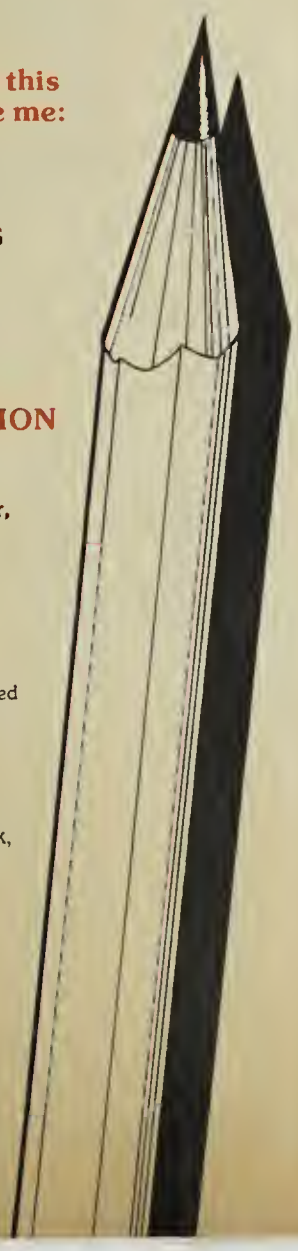

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Ontel CRT Systems User-Programmable, Feature 64K Micro

PLAINVIEW, N.Y. – A communications-oriented, user-programmable series of multiprocessor terminal systems has been introduced by Ontel Corp.

The OP-1 series of terminals includes a central microprocessor unit with up to 64K memory, a display microprocessor and a CRT as standard equipment. An I/O microprocessor and display controllers can be either standard or optional equipment, the company said

The terminals can operate as stand-alone units or in an on-line environment, except for the OP1/S, which is a slave unit for use in cluster configurations.

The OP1/8, OP1/16 and OP1/64 contain communications controllers that transmit synchronously at speeds up to 50 kbit/sec through multipoint or direct EIA RS-232 communications capabilities, Ontel said.

An optional asynchronous I/O adapter allows direct communications with a CPU's I/O bus at 110- to 9,600 bit/sec through EIA RS-232-compatible communications.

The CRT on all terminals in the series includes a 1,920-character display with 80 char./line in a 5 by 7 dot matrix configuration, the company said.

The OP1/S and OP1/8 terminals include a 64-character upper case Ascii keyboard with control pad as standard equipment, it added.

The OP1/16 has 16K RAM, ROM or Prom; the OP1/64 features 64K of RAM, ROM or Prom. Bootstrap loading is standard on both models, Ontel said.

Both the OP1/16 and OP1/64 have optional 112-character upper/lower case Ascii keyboards with control pad, numeric pad, function pad and illuminated keys as standard equipment, the company said.

The OP1/S slave unit is priced at $1,100; the OP1/8 costs $2,400; and the OP1/16 and OP1/64 cost $5,000 and $11,000 respectively. Ontel is at 3 Fairchild Court, Plainview, N.Y. 11803.

Infoton Vistar Display Teletypewriter-Compatible

BURLINGTON, Mass. – The Vistar/GTX from Infoton is a teletypewriter-compatible display terminal.

Standard features include a 1,920-character (80 by 24) display; EIA RS-232 and 20- or 60 mA current loop interfaces; 15 switch-selectable transmission rates from 50- to 9,600 bit/sec; and an external, solid-state detachable keyboard.

The terminal costs $990 in quantities of 25, with first deliveries in March. Infoton is at Second Ave., Burlington, Mass. 01803.

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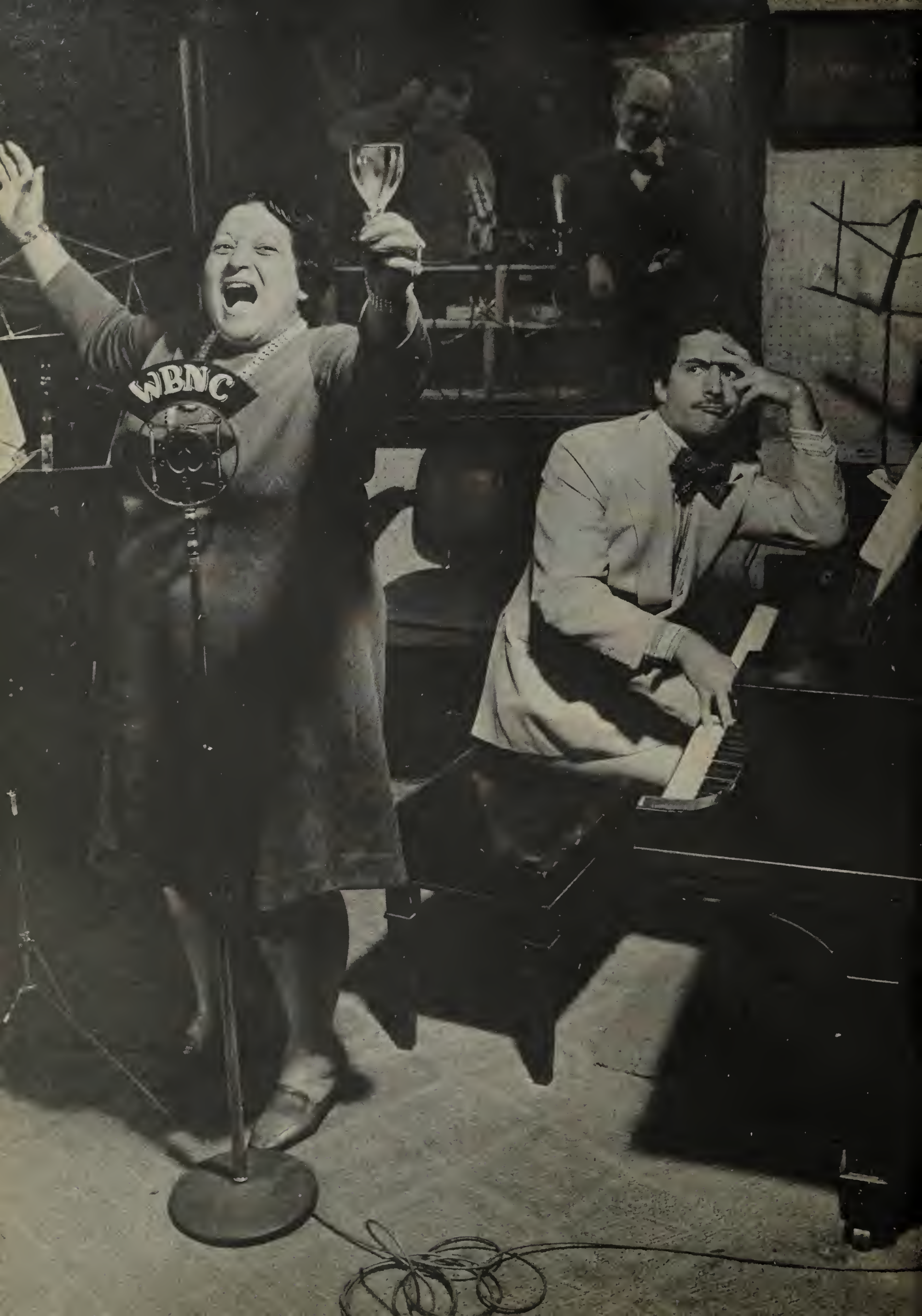
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SCM Kleinschmidt Offerings Include Series of CRTs

DEERFIELD, Ill. – SCM Kleinschmidt has introduced a series of communications terminals and a data processing system and has reintroduced the 100 series of teletypewriters for military and commercial use.

The 7300 series of data communications terminals includes three models operating in either Ascii or Baudot codes, the company said.

In each code version, automatic send/receive (ASR) keyboard send/receive (KSR) and receive-only (RO) models are available.

Each of the models is equipped with switch-selectable speeds of 50-, 75-, 100-, 110-, 150-, 200- and 300 bit/sec, the company said, adding the terminals can print at speeds up to 40 char./sec through hard-wired lines.

Each model can transmit in serial or parallel mode, it added.

The Model 7301 (Ascii) and Model 7311 (Baudot) RO terminals have a standard 72-column width, although an 80-column width is offered optionally, the company said.

The Model 7302 KSR terminal has a 4-row standard 128-character Ascii keyboard and the Model 7312 KSR has a 3-row standard Baudot/CCITT keyboard.

The ASR models 7303 and 7313 include the keyboard characteristics of the KSR models and also incorporate tape reader/punch units.

Baudot models 7311, 7312 and 7313 offer optional interface compatibility with EIA, RS-232 and Telex/Gentex circuits, SCM said.

Other optional features for all models in the 7300 series include a character counter, single/double line feed, form feed, vertical and horizontal tab and selective call, the company said.

Models 7301 and 7311 are priced at $9,100; models 7302 and 7312 cost $9,700; and the 7303 and 7313 costs $14,000, a company spokesman said.

Model 7400 System

Along with the 7300 series, SCM Kleinschmidt also introduced the Model 7400 data processing system.

The TC-7400 terminal controller supports CRT terminals, card reader/punches, disk drives, line printers, character printers and communications lines with transmission speeds from 75- to 9,600 bit/sec, SCM said.

Component specifications for the CRT terminals are an 80-character, 12- or 24-line format and 7 by 7 dot matrix display.

The terminals have a 96-character Ascii subset and 128-code, 7-bit Ascii keyboard character set with 63 keys, the firm said.

The cartridge disk drives are rack-mounted and offer the user up to 100M-bit capacity, the company said.

The 7400 also includes a Model 7455 card reader that operates at 300 card/min; a Kleinschmidt 7502 KSR printer, 7501 RO printer and 7360 line printer, it said.

In addition, the 7400 system includes a Model 7455 card reader that operates at 300 card/min and a Model 7450 card reader/punch that reads at 200 card/min and punches at 45 to 75 card/min, it added.

Printers offered with the system include Kleinschmidt Model 7360 600 line/min line printers, the Model 7501 30 char./sec RO printer and the Model 7502 30 char./sec KSR printer, the company said

Terminal Transactions

The TC-7400 terminal controller operates under 4K to 64K directly addressable memory and is said to be capable of simultaneous transmission and reception of communications over multiple lines; it also provides line monitoring functions, SCM said.

The controller includes a flexible disk storage capability with 2,000-card image capacity.

The 7400 DP system price depends upon peripherals desired and user requirements, according to a company spokesman.

The company also said it is remanufacturing its 100 series of teletypewriter keyboard and tape send/receive terminal sets.

The teletypewriter set has operational speeds of 60- to 100 word/min, the company said.

Teletypewriter set and components prices for the 100 series and specifications and prices for the 7300 terminal series and 7400 DP system can be obtained from SCM Kleinschmidt at Lake-Cook Road, Deerfield, Ill. 60015.

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S&L 'Breaks Even' in Switch to Intelligent Teller Units

By John P. Hebert
Of the CW Staff

CHICAGO – A large savings and loan (S&L) association here has replaced second-generation terminals with intelligent teller terminals operating in an on-line network for about the same cost.

In addition, utilizing the programmable terminals allowed the S&L to install the terminals gradually, rather than making a nerve-racking conversion overnight, according to James Belcher, a corporate vice-president of First Federal Savings & Loan of Chicago.

The on-line, real-time system is now in full operation at First Federal headquarters after a conversion from 82 IBM 2980 teller terminals to 102 Bunker Ramo Corp. 2001 universal teller terminals, Belcher said.

The conversion only took two months' time and there were "no more problems than normally" crop up when off-the-shelf hardware is installed, he said.

When the S&L installed the universal teller terminals, it received all related peripheral equipment, multiplexers, off-line data collection devices and a passbook magnetic stripe-affixing device for about the same price the 82 2980s had cost, Belcher said.

"It was like getting 20 terminals free, and we also gained the added benefit of improved teller productivity," he added.

First Federal has installed the terminals in its 10 local offices and the downtown headquarters.

The terminals transmit customer passbook information through the S&L's network to an IBM 370/145 mainframe at The Saving Place, Inc., its DP subsidiary, according to Belcher, who is also that firm's president.

Because "each Bunker Ramo terminal is a minicomputer, we programmed it to look like a 2980. But they aren't running in 2980 emulation," he said.

"We went one step further – we programmed the terminals to utilize all of the terminal options and, during communication, we format the messages to make them look like 2980 communications.

"While using the intelligent, programmable feature of the 2001, we can take advantage of the 2001's 'native mode' capabilities (magnetic stripe passbook reader, CRT screen, off-line data capture, etc.)

"An outstanding advantage of the 2001 is its adaptability to our existing mainframe," Belcher said.

"We saved money by not having to replace or alter the main unit, and we are able to implement the system in phases, eliminating bugs and training tellers as we go along instead of risking turmoil with a sudden hardware conversion," Belcher explained.

The 2001s were installed in groups of 10 after they cycled through a teller training/hardware shakedown area. As a 2001 was installed, the terminal being replaced was removed from production.

Binary Synchronous Mode

Information is transmitted from the 10 branch offices over dial-up private lines in a multidrop configuration at 2,400 bit/sec.

The information is sent in binary synchronous mode from the 2001s, even though they normally transmit asynchronously, because they can be programmed that way, he noted. Messages from the teller terminals are sent through Intertel MCS 2400 modems.

To cut communications costs in half, the S&L opted for a multidrop line configuration off of the private lines. There are an average of four drops per line in the network, he added.

The information is sent through these lines to an Intertel MPT-500 central communications monitor, which tests the quality of the lines and data going through the lines.

In the event of a line failure, the monitor will dial up any line that has failed in order to test it, determine the nature of the failure and immediately dial up a telephone company line, he explained.

People at The Saving Place then call the telephone company and have it fix the primary line, he said.

"The monitor also detects hardware failures and switches the functions of the hardware that is down to other equipment.

The communications monitor played a part in the installation of the 2001 terminals, because it can isolate problems and failures in the terminals, Belcher said: "We knew right away if the terminals weren't working properly."

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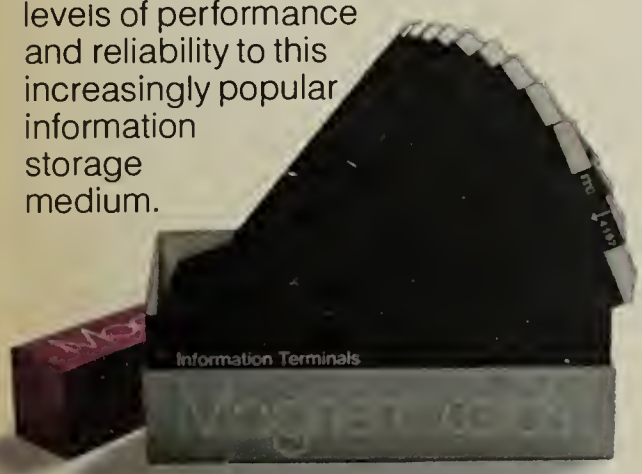

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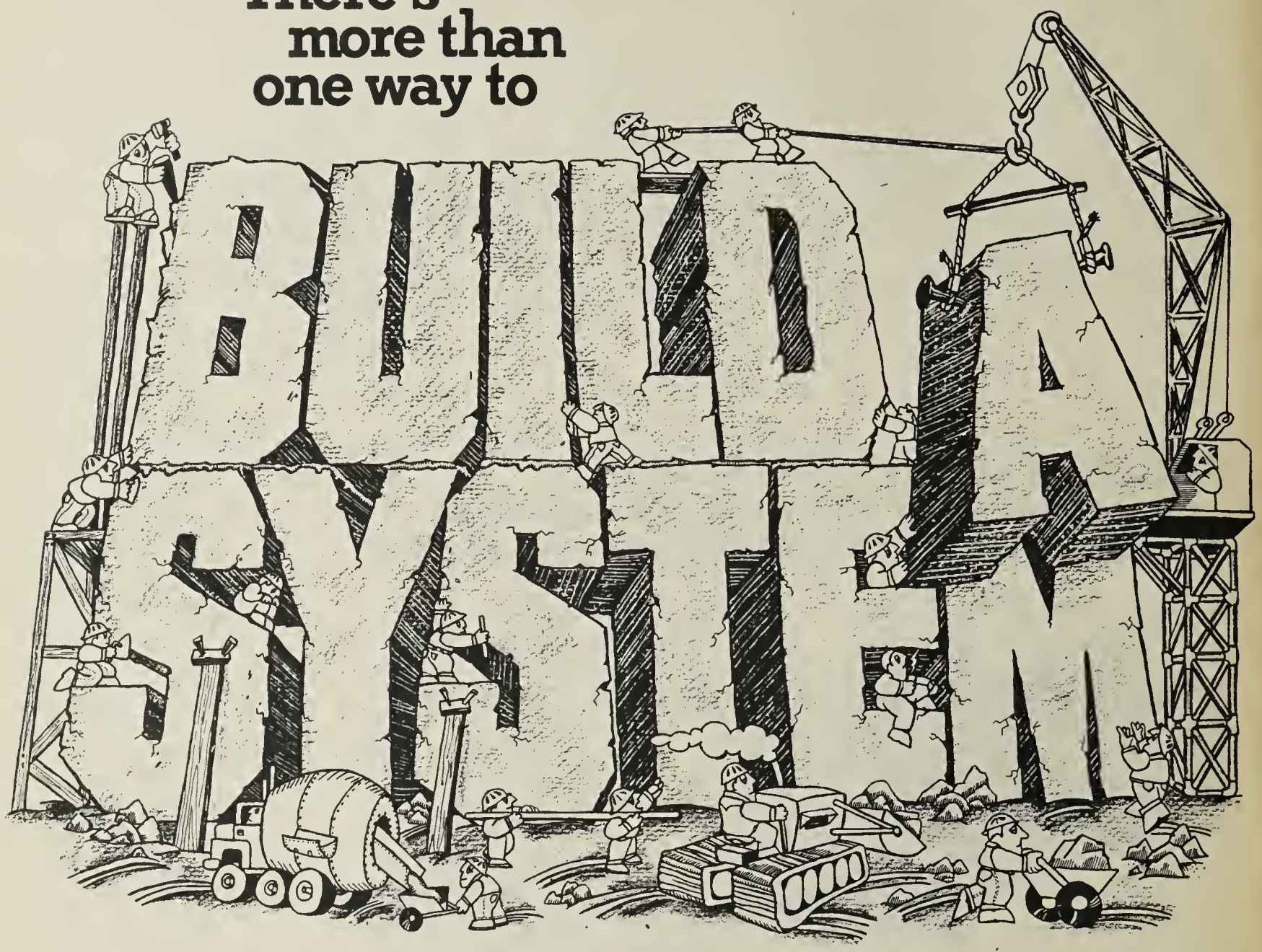

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These are averages. Complexity and size of job may increase or decrease the figures shown. We'd like to send you our **Systems Overview Handbook,** which details costs, rates and methods of working, including supporting data on typical in-house costs.

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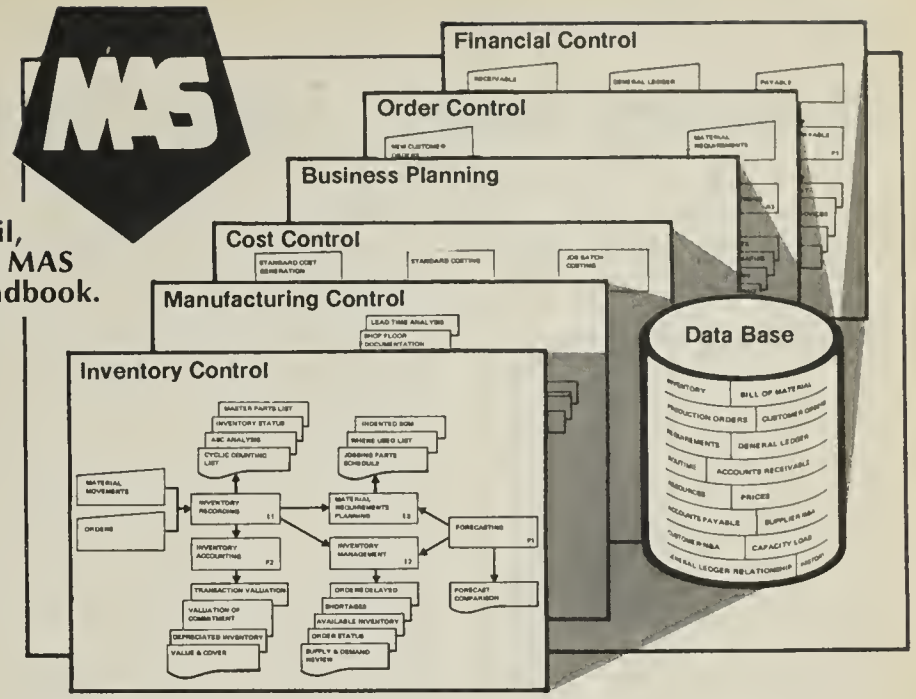

Economy

We're not preoccupied with cost reduction in the systems development process. We know that quality is more important as reflected in user satisfaction, operating convenience and economy, freedom from program errors and long term adaptability. As well, specialist skills, assured results and schedule flexibility may mean as much to the client manager. But a proper mix of $6, $4, $2 and $1 code can meet objectives without constraining system definition, while cutting expected cost by, say, half. And the perspective that permits this control and cost saving helps improve schedule and quality performance.

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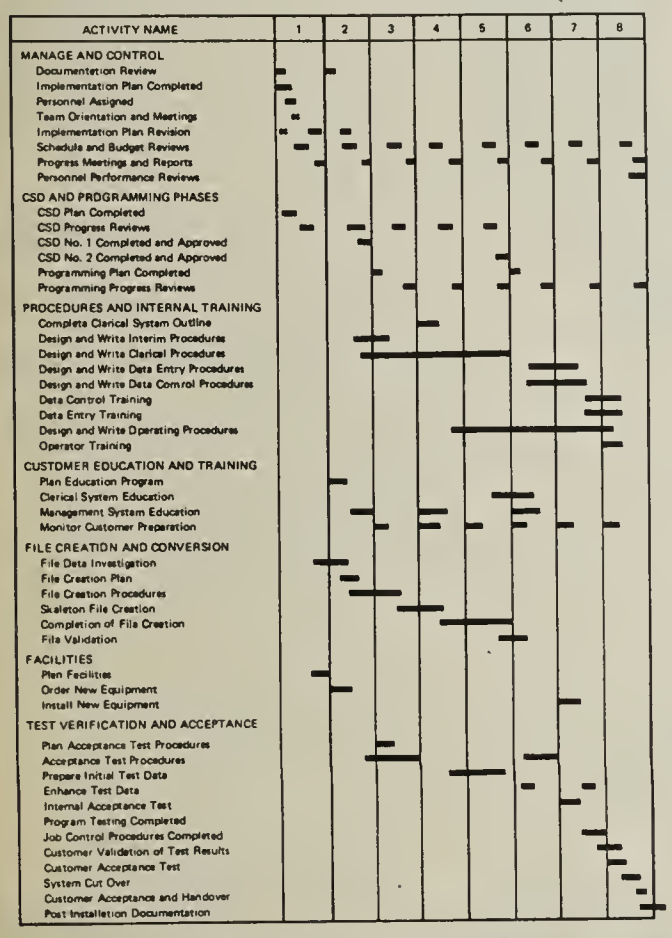

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A Modest, Careful Approach

In ten years of building systems, our objectives have remained unchanged: to provide what our client wants; to work carefully and reliably; to work economically. Ultimately our success depends on sound product engineering. Investment since 1966 in software technology has resulted in our "Master Series" (modular programming test harnesses, table processors, data management languages) of software tools. These packages have been commercial successes in their own right with 100 in use worldwide.

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Our people are just as likely to be engineers, accountants, or marketing experts as computer professionals. It helps in running our own business; and it helps in dealing with clients, that we understand the realities of business life, as well as the technicalities of systems development. This attention to business systems expertise and business-like performance is reflected in our unique range of off-the-shelf Modular Application Systems. Built in 1967 with Version 2 released in 1973, over 500 of these tailorable business systems have now been installed. The client gets a system to his exact specification, proven performance, and major cost reduction. We get a trouble free life and high margin. The only reason they sell so well is that they fit the planning and control needs of businesses: and the reason they *fit* so well is that they were designed and built by people who specialize in business and business systems.

For More Information: We'll gladly send our Overview Handbooks. Please contact Dick Nemerson at MMDS Headquarters, (301) 823-1600, 300 East Joppa Road, Baltimore, Maryland 21204. Please let him know your particular interest. We'll respond by return mail. We look forward to hearing from you.

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Modcomp Series Combines RJE, Batch Capabilities

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc. (Modcomp) has introduced a series of remote terminal systems designed to combine remote job-entry (RJE) capabilities with local batch capabilities, the company said.

The RTS series consists of three systems of increasing capability: the RTS-1, -2 and -3, which make it possible, the company said, for users to obtain a remote terminal system at a price comparable to an intelligent batch terminal.

In addition to providing the same increased protocol benefits as those offered by intelligent terminals (additional manufacturers' communication protocols, more efficient protocols and increased diagnostic capabilities), the RTS series enables much of the computing load currently being transmitted to a large central computer to be executed locally, Modcomp said.

Additional functions such as program or data preparation, local file maintenance, data validation and preprocessing can be performed locally, it said.

The RTS models offer IBM 2780 and 3780 and CDC 200 UT terminal emulations as well as local batch processing capability as standard equipment, the company said.

Emulators for the IBM Hasp Workstation and Univac 1004 terminals are offered as optional equipment for the RTS models 2 and 3, a company spokesman said.

All RTS systems include disk storage, card readers, line printers, CRTs and at least 64K bytes of core memory, although magnetic tape storage, faster card readers and line printers are offered as options, the company said.

The RTS-1 is a system in which local batch processing is performed alternatively with the terminal emulation, the company said.

Built around the Modcomp-II/12 CPU with 64K bytes of core memory, the RTS-1 includes a CRT; dual floppy disks with 616K-byte capacity; an 80-column, 300 card/min reader; a 132-column, 300 line/min printer; and modem interface, it said.

The software system is supplied on floppy diskettes, pregenerated and ready to use. Terminal emulators are loaded, activated and controlled by operator commands through the CRT console, the company said.

In the RTS-2 system, a larger capacity (2.54M-byte) faster access cartridge disk replaces the floppy disk as a system device, Modcomp said.

Modcomp RTS-1 Terminal System

The expanded disk capability in RTS-2 makes it possible to provide additional system processors and capability which enhance the overall system capability, according to the firm.

Standard system elements and macros are provided to enable the user to do a custom system generation should he ever wish to tailor the system to special applications, the company said.

The RTS-3 features twice the disk and memory capacity of the RTS-2, with 5M-byte moving-head disk storage and 128K-byte core memory and floating-point hardware, it said.

The RTS-3 is designed for concurrent terminal emulation and local batch processing, Modcomp added.

All RTS systems feature terminal speeds up to 9,600 bit/sec, the spokesman said.

The RTS-1 is priced at $39,450 to $46,200; the RTS-2 costs between $43,450 and $50,200; and the RTS-3 is priced at $55,450 to $62,200, depending upon options, the spokesman said from 1650 W. McNab Road, Fort Lauderdale, Fla. 33309.

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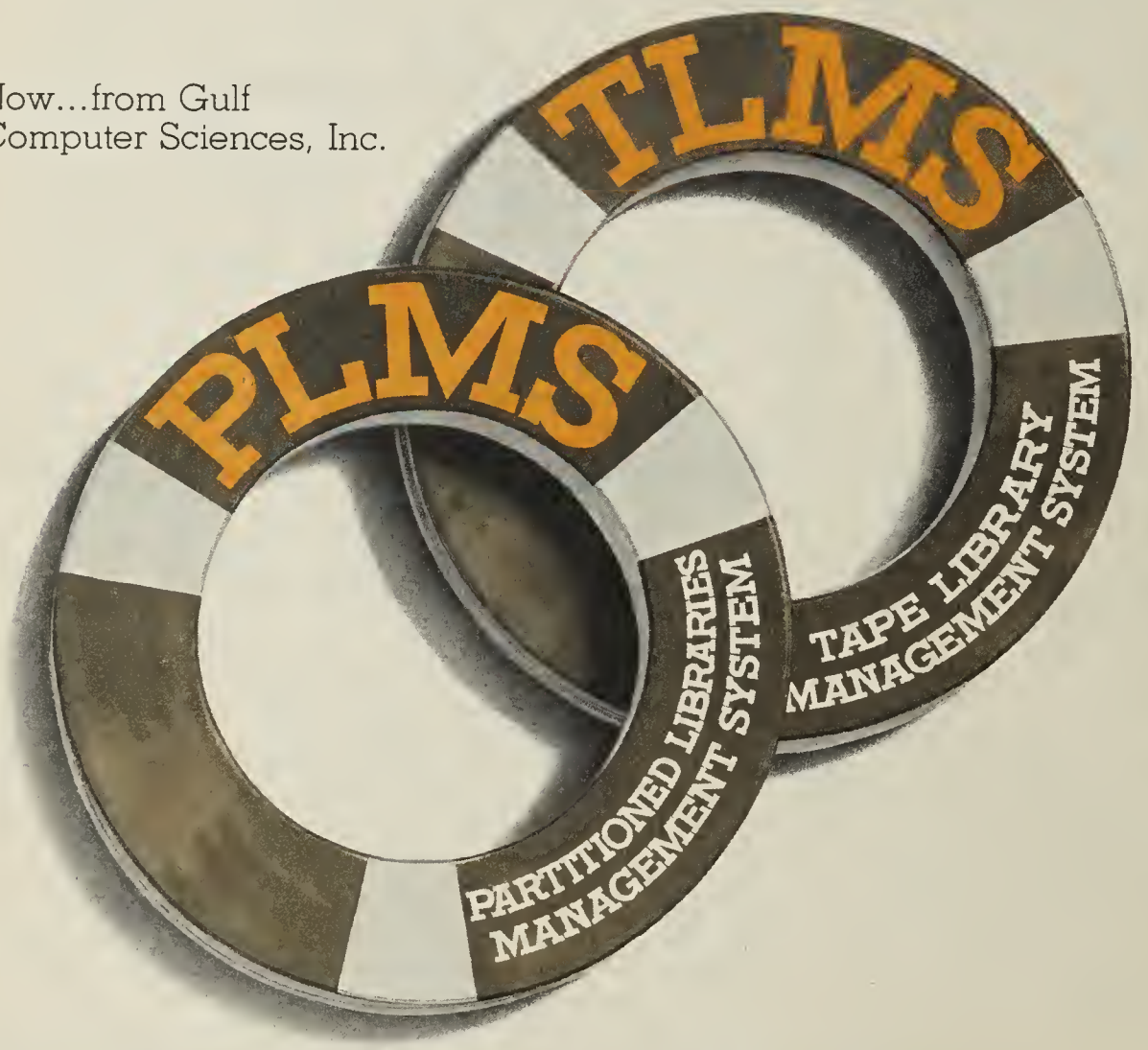

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TI Unit Authorizes Checks, Credit Cards For On-Line Usage

HOUSTON – The Digital Systems Division of Texas Instruments, Inc. (TI) has an on-line credit card and check authorization terminal.

The TI Numeric Entry Terminal (Tinet) is connected to a host computer and a data base and is said to allow a clerk to immediately determine a customer's checking or credit card account status.

The Tinet system consists of a clerk's terminal, a station controller and a modem and is designed for interactive data entry and retrieval applications, according to the company.

Addressing Architecture

The terminal's addressing architecture allows up to 48 terminals on the same local line with transmission speeds from 1,200- to 4,800 bit/sec, it said.

The station controller permits up to 16 terminals for each modem hookup at a remote location, the company added.

The Tinet system includes a 12-digit numeric display, 19-button keyboard, six status lights and up to 14 field identification lights, TI said.

Terminal features include calculator addition and subtraction functions in an off-line mode; optional features include two input and two output ports for the control of peripherals, the company added.

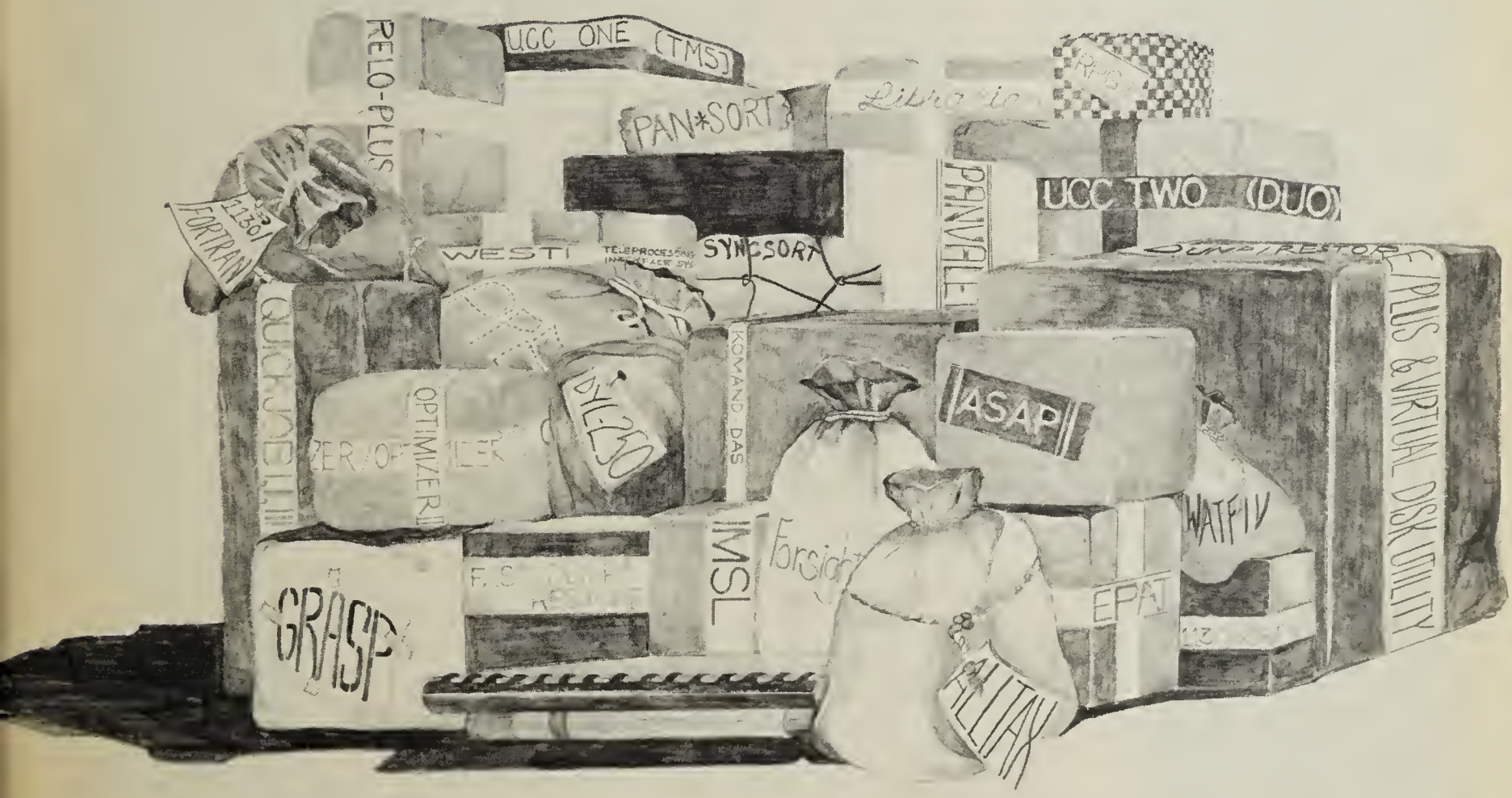
The terminals cost $500 each in quantities of 1,000 or more.

TI's address is Box 1444, Houston, Texas 77001.

Software Packages

A Computerworld Special Report

FEBRUARY 23, 1976



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A Sign of Maturity

Package Horror Stories Now in Past

By Don Leavitt
Of the CW Staff

A good indication of the growing maturity of DP management lies in the expanding trend to acquisition of software from outside sources.

Horror stories and disparaging remarks about programs that were "not invented here" are more and more being replaced with tales of very positive, very successful acquisitions from a variety of sources.

The reasons for going "outside" for packages have been covered in numerous articles, but they bear repeating.

One of the clearest summaries was in a supplement of *NCC Interface*, published by the National Computing Center in the UK: "The computing community needs software products to be available for three basic reasons:

"1. Economy – A well-marketed software product should cost organizations considerably less than if they had to develop it themselves. In addition, the ready availability of suitable software product should mean a considerable reduction in the time scale required to introduce a new system into an organization.

"2. Quality – Organizations which are not very large do not normally have staff with skills to produce in-house their whole required range of software. As a result, many do not use their computers as widely as they should for the good of their business.

"The availability of good software produced by specialists should encourage them to widen their horizons. Moreover, the facilities offered by packages are often updated to meet current needs or include the latest techniques.

"3. Staffing Level – Through buying software products an organization can keep its staff level down to those it requires to produce only the software unique to its own needs."

The NCC writer continued his assessment of the present situation and need for software as follows:

"Software products can be roughly categorized as utilities, languages, operating systems and applications. The majority of packages currently offered [are] utilities. Users generally use the operating systems and languages supplied by the [computer] manufacturer whilst, on the whole, applications are written in-house.

"Users are now increasingly buying utilities from nonhardware manufacturer sources, which they will do only if such products are in some sense preferable to those supplied by the [computer] manufacturer" or capable of being developed in-house.

Articles in this special report illustrate some of the forces DP managers have felt leading them to consider outside software and some of the selection methods they have used to screen the often-extensive range of similar products available.

An analysis of actual modification costs reported by users, however, shows quite clearly that the original package price isn't necessarily the end of the money paid for the programs.

Software Acquisition Process Outlined in Booklet for Users

By Don Leavitt
Of the CW Staff

CARMEL, Ind. – "Sometime this year, you will undoubtedly be faced with the necessity – or realize the desirability – of buying a software product," L.A. Welke said in *Buying Software*, a slim booklet published last year.

"The trick is to conduct the . . . acquisition process in such a manner as to come away knowing that you bought, rather than that you were sold."

Regardless of who identifies the need to get software from an outside source, the president of International Computer Programs, Inc. (ICP) said the criteria of the need is "invariably:"

- An ambitious management requirement.
- A critical time schedule.
- Insufficient staff.
- Insufficient expertise.

Any one of these factors can cause a crisis situation that a software package might easily solve, but "the presence of all four factors would undoubtedly cause chaos, a condition that even the finest software package might not cure," he added.

The user buying software from outside sources is faced with two responsibilities beyond those he usually faces. The first, Welke explained, is the responsibility to perform a complete yet inexpensive search for what's available to meet the perceived need.

The second responsibility is that of evaluation. While that "has an ominous ring to it, in reality, it is not all that bad, and indeed can have its elements of fun," he added.

In his description of information sources available to the potential buyer, Welke referred (quite understandably and justifiably) to the *ICP Software Directory*, which lists in capsule form, but in vendor's words, several thousand packages from hundreds of sources.

Other trade publications and the services of Auerbach Publishers, Inc. and Datapro Research Corp. are also available, often providing more extensive and objective evaluations, but of fewer products.

In any case, once the search for available products has been effectively completed (new products can be found almost every day if the search is diligent enough), the user must gather data for the evaluation process. A formalized request for proposal (RFP) can be drawn up to be mailed to selected vendors, and this RFP should state the user's system requirements, operating system environment and proposed time schedule.

Formalizing this effort has two benefits, Welke said. It makes the user more orderly in his thinking processes and makes the vendor see the request as coming from a serious buyer rather than a tire kicker.

The RFP should request a copy of the

(Continued on Page S/16)

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This special report was prepared under the direction of Associate Editor/Software Donald Leavitt. Cover art by Cynthia L. Kintzer features the 25 packages on the 1975 Software Honor Roll compiled by Datapro Research Corp.

Bon voyage to costly DOS & DOS/VS program library maintenance.

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Successful With Both

Firm Uses Two Approaches in Selection of Software

By Don Leavitt
Of the CW Staff

NEW YORK – Interest in acquiring packages builds up and is met in different ways. Illustrative of that has been the experience of Sperry & Hutchinson Co. (S&H) over the past several years, according to Charles Rauch, assistant to the firm's director of information services.

S&H acquired Autotab from Capex Corp., for example, as a result of requests from end users in budget departments within the corporation, he said.

Asi-st from Application Software, Inc., on the other hand, was brought in because the DP staff itself felt a need to have file retrieval/reporting capabilities.

Each selection process took about the same amount of time – less than three months – but the approaches differed markedly. The search leading to Autotab was handled by Rauch alone; the one ending at Asi-st utilized a team approach, with Rauch as chairman.

S&H is a corporation probably best known for its Green Stamps distributed by merchants and redeemable, when collected in sufficient quantity, for a choice of brand-name products distributed in a series of redemption centers run by S&H.

As part of its internal organization, the company has a 1M-byte IBM 370/155 Model 1 operating under OS/MFT. It has six spindles of 3330 disk storage and "about 14" tape drives.

Thanks to what Rauch termed "very effective" use of tape files, the data is split "just about 50-50" between the two media

Rauch became involved in the evaluation of packages, and the ultimate choice of Autotab, "somewhat indirectly. Two different budget departments – one in the trading stamp company, the other at corporate headquarters – were using different time-sharing services" for analytical work.

"One of these departments was programming in Fortran just because an accountant there had studied Fortran in college," he noted. "The other was using a packaged system that was made available through its particular time-sharing vendor."

But both departments saw their time-sharing charges mounting and began to realize it was, in Rauch's words, "an absurdity" to keep going that way "with a computer just sitting downstairs, as it were." So they went to the DP staff and asked what it could do for them.

Rauch looked into Datapro Research Corp. manuals and the *ICP Quarterly* to get a list of packages that might meet the budgeters' needs. The evaluation was done by him on "a very subjective, but not a quick and dirty" basis, he said.

Without a scoring scheme or feature matrix analysis, he narrowed the field to five or six candidates that could run in the S&H environment. Then he "got manuals, talked to salesmen, but didn't really get involved in talking to other users."

He talked instead to potential users within S&H to see what they needed and wanted. With the range of capabilities apparently available in the packages, he asked the accountants, in effect, "Are you really going to do multiple correlation regressions, or are you interested in duplicating what you do now with a spread sheet and paper and pencil?"

Went Beyond Current Needs

Then he decided to pick something a little bit beyond what the users saw as their needs. Once they got the system, he explained recently, "it would be like giving whiskey to the Indians. I wanted to give them as much power as we could consistent with what they were willing to pay."

From this effort, he proposed Autotab. "One minor consideration," he said, "was that Autotab is available on a time-sharing service we had used in the past and with which we had good relations. It had the potential then for backup in case our system ever went down . . . but that hasn't happened."

The selection process was aided by Capex's responses to S&H's questions about the product – in contrast, for example, to other vendors (notably IBM, he said) that were very slow.

"Capex had [what we wanted]; it knew it had it and it came on strong."

Rauch had no difficulties installing the package or in running with it, he said. "But that doesn't mean it's bug-free. We did find bugs from time to time, but I'd have to give Capex high marks on its response to our problems."

Since it was brought in-house, the batch-oriented Autotab has expanded its following and is now being used in "many departments, primarily in financial and accounting areas. It is," Rauch noted at another point in the interview, "an accountant's package that does what accountants do."

Memo From Above

The activity leading to Asi-st started, Rauch recalled, with a memo from his boss asking for a specific recommendation within three months on "what we should do vis-a-vis report generator or data retrieval packages."

This time, a group of five – from the staff of 25 analysts and programmers – went to the reference guides, made up a list of potentially useful packages, split the list among the members and went to work. Meeting every 10 days or so, the group defined what characteristics it needed.

"We wanted to be able to extract from various types of files . . . wanted default options in the system so reports would be readable without a lot of 'prettying up' . . . We [wanted] to be able to have own-code exits . . . the ability to get to Isam files on random as well as sequential basis . . . and we wanted real Boolean logic power," Rauch said, recalling the meetings that spawned such a list.

As chairman, Rauch put this together in a "semiformal" fashion but "not in any definitive document that I'd be willing to publish as a 'hey, this is the way to do it' guide."

The group contacted vendors, inviting

(Continued on Page S/18)

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Speaking of structure

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Instrument Firm Uses Packages To Save Time, Money on Jobs

NORTH WALES, Pa. – For more than 75 years, Leeds & Northrup Co. (L&N) has been developing and manufacturing instrumentation to help scientists and engineers convert the uncertainties of the natural and industrial environment into measurable and controllable facts.

Today at headquarters here, nearly 4,000 people design, manufacture, assemble and control tens of thousands of parts, components, subassemblies and finished instrument products and process control systems to make up L&N's line.

Last year over $120 million worth of products were shipped to customers all over the world. Products ranged from a single thermocouple to multimillion-dollar systems for measuring and controlling full-scale manufacturing operations.

The complexities of maintaining order are staggering. Partly because of the company's Corporate Systems Department, the task of administering and scheduling critical resources in an ever-changing environment is under control. Thirteen full-time programmers maintain, service and improve a library of over 3,000 programs, ranging from payroll and accounting systems support to systems for control of parts and materials.

L&N has used a number of products from Applied Data Research, Inc. (ADR) to support this effort. "We've had everything from Autoflow (for flowcharting) to Look (for monitoring production job-stream problems as they occur)," according to Joe Dupon, the company's manager of computer technology.

Dupon is charged with keeping the computer system (now an IBM 370/145 under OS/VS1) and programs running at peak efficiency. His job is to investigate better ways of doing things, to be sure programmers are using the best techniques and procedures and to maintain the operating systems and a variety of programming tools.

He investigated ADR's Roscoe when a significantly better materials management system was about to be installed. This installation necessitated changes to hundreds of application programs. Roscoe's conversational mode of operation answered the need for a faster and more accurate method to make the hundreds of required changes to L&N's programs.

Saved $26,000

It was estimated that its 13 programmers spent 5,200 hours a year performing routine maintenance tasks. In the first eight months Roscoe was in use, maintenance time appeared to have been reduced 50% for an estimated avoided cost of $26,000.

This benefit alone paid for the entire cost of Roscoe and its maintenance on four terminals in its first year of use.

That estimate was based on a controlled three or four-month test in which two teams (one with, the other without, Roscoe) performed comparable jobs. Though use of Roscoe is still saving L&N money, Dupon is unable to quantify the savings since "everyone" is using the ADR support and there's no base for comparison.

But that's not the whole story.

JCL errors, always a source of frustration, have been markedly reduced too. Instead of filling out lengthy JCL cards, keypunching and waiting up to four hours to get cards into the system, the programmer just sits at the Roscoe-equip-

(Continued on Page S/14)

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MILWAUKEE – In the late 1960s and early 1970s, the Nordberg Manufacturing Co. (now a part of Rexnord) was experiencing severe competitive pressures in the areas of product lead times quoted for delivery and for resources such as people, materials, equipment and capital.

Management implemented a computerized job shop manufacturing control to reduce lead times and save inventories by more effective utilization of operators, machines and assembly areas.

In addition to the development of the system, basic reliable operating data such as manufacturing-oriented bills of material, manufacturing routines, inventory and shop load also had to be developed or extracted from manual records and loaded into the computer.

By 1973, a conversational-mode material requirements planning (MRP) inventory system with manual interrupt between stock levels was developed and made operational. Orders were scheduled mechanically and entered into the shop load.

A shop floor control system was developed and implemented with daily dispatch lists generated by the computer. Shop packets were generated by the computer. Labor was reported through a data collection system to a central dispatch operation.

A computerized standard data system was also implemented to calculate operations feeds and speeds and standard hours which were used to schedule items and evaluate actual labor performance. Shop labor performance reports were issued daily.

The overall shop input was controlled by a master scheduling system.

In 1972, the Total data base management system was acquired from Cincom Systems, Inc. This was used to develop a centralized data base in which all operating data would be stored and maintained for use by all application systems, thereby eliminating the administrative and timing problems of a multiple data base system.

In late 1973, most systems were operating under Total, and corporate business growth projections indicated there would be need to implement programs to further improve return of assets.

The effect of these efforts through 1974 was to increase inventory turnover from 1.6 for the years 1967 through 1970 to 2.1 in 1974 on a representative major-product line. The capital investment in inventory which was avoided due to higher turnovers was $3.7 million in 1974.

Plant Output Increased

Plant output had increased significantly due to more effective use of operators, machines and floor space, and manufacturing was more consistently meeting schedules and commitments. Product lead times were reduced, contributing to an increase in business booked.

'The effect of these efforts through 1974 was to increase inventory turnover from 1.6 for the years 1967 through 1970 to 2.1 in 1974 on a representative major-product line. The capital investment in inventory which was avoided . . . was $3.7 million in 1974.'

While the results were impressive, significant problems had to be overcome to achieve even better results. One of the most important of these was the time required to reflect a change in master schedules or upper-level requirements through all levels of the product structure.

MRP was operational, but required three to four weeks to replan requirements through all levels to reflect changes in master schedules. While this was a considerable improvement over the old manual system (which was almost impossible to replan), it was still not good enough when viewed in terms of the business activity which can take place in three to four weeks or the lead time which can be lost on low-level items due to the length of the replanning cycle.

A second problem was a possible loss in requirements continuity because of manual intervention at all levels of the product structure from both a quantity and a date-required point of view.

Lower level dependent demand requirement quantities and due dates could be out of phase with upper-level requirements. As a result, there was no positive assurance that lower-level planning was in phase with master schedules or upper-level requirements.

A third problem, related to the second, was human error. Although considerably reduced from the manual system, errors still occurred often enough to affect the performance of the system. The result was either higher inventories or shortages and losses in income because of shipments delayed by shortages.

At the Nordberg Machinery Group (NMC), all projects which would contribute to a reduction in inventories were reviewed. One was the accelerated installation of a fully mechanized *net-change* MRP system.

Various approaches were considered: in-house development, subcontracting to an outside group or purchasing an existing system and modifying it as required.

The third approach was the most desirable, NMG decided.

Purchased Pios

And so the company purchased the Production and Inventory Optimization System (Pios) package from Rath & Strong, Inc.

The system included most of the features required by NMG, but modifications were needed to interface with existing in-house applications and to provide additional features which would allow Pios to be used in a major job shop environment.

The system was installed in December 1974. There were virtually no problems

(Continued on Page S/18)

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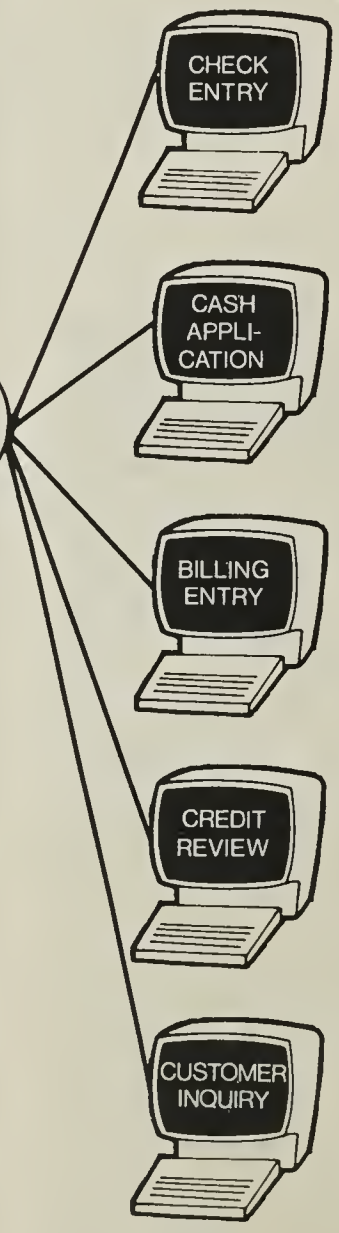

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Users Changing Packages Typically Spend $4,000

By Mal Stiefel
Special to Computerworld

Prospective software package buyers frequently ask, "How much will it cost me to modify a program once I acquire it?" Some indication may come from an analysis of the latest annual *User Ratings of Proprietary Software* published in November by Datapro Research Corp.

Close to 40% of all users who answered the survey on which the publication was based modified their packages. In addition:

- The average cost of modification was about $4,000.
- Almost 80% of the application package users had to change their software.
- The probability of modification and the actual cost depended heavily on the nature of the package and its use. In specific cases, costs soared over $50,000.
- Higher quality packages seem to require less modification than poorer products.
- In some classes of packages, modification costs were negligible.

The statistical breakdown on which these conclusions were based is shown in the accompanying figures. Eighty-three of the 210 packages treated in the Datapro report were analyzed; no modification cost data was published about the others.

For the sake of comparison, five separate classes were considered: applications (payroll, general ledger, accounting, insurance, banking, etc.); data base management systems (DBMS); sorts; compilers; and "system" packages (utilities, communications monitors, librarians, etc.)

Applications Higher

Figure 1 summarizes the entire survey. It shows, among other things, system packages dominated the responses, although application packages led in average costs.

Column G in Figure 1 gives an expected value for the cost of modification, obtained by dividing total costs by total users, including those who reported the need to make changes and those who reported no need.

The absolute figures aren't as revealing as the ratios: the figure for application packages is three times that of system packages and DBMS packages.

More significant perhaps is the broad variation in costs in specific instances.

For example, almost 40% of the total $3 million cost was incurred by users of just two packages: IBM's Customer Information Control System (CICS) (59 users made no changes; 77 made changes averaging $10,170; total cost was $783,090) and Management Science America's Payroll/Personnel application package (costing 37 of 44 users $15,171 on the average; total cost $561,327).

It's reasonable to expect, however, that among this group there were one or more who had to spend more than $50,000 to tailor the package to their needs. This is only a guess, since details for individual users weren't available in the report.

Removing the two "heavyweights," Figure 2 evaluates the data for the other 81 packages. Application packages continue to dominate in frequency of modification (78%) and in average cost – five times the expected cost of the system packages, in Column G, and more than two and one half times the DBMS costs.

In both Figure 1 and Figure 2, the same negligible figures are entered for sorts and compilers. This may satisfy any intuitive feelings that these well-worn programs shouldn't have to be touched.

Yet one out of five sort program users and two of five compiler users reported some need to make changes, by themselves or the vendor. We may assume this was done to optimize throughput or add some special feature for a given installation, rather than to alter the program to make it work.

To examine a different dimension of the question, Figure 3 highlights the 16 packages on Datapro's Honor Roll [CW, Dec. 10] for which cost data was reported. There were nine other packages on the Honor Roll for which costs weren't reported.

The results are interesting in that there is an order of magnitude of difference in the cost figures of the Honor Roll group and the others.

The difference can't simply be written off as a consequence of insufficient sample size. Almost 25% of all the users in the study reported on Honor Roll packages. They clearly had significantly less call than the rest of the users for changes to their packages.

Figures 4 and 5 differ from the others only in the presence or absence of CICS statistics.

A comparison of Tables 2 and 5 reveals:

- Fifty-two percent of IBM users modified their packages, compared with 38% of the entire group.
- Almost all of the IBM application packages had to be modified.
- Average system package costs for IBM users were twice those of the full group.

Multiple Modifications

It should be noted certain assumptions were made in using the information in Datapro's report.

To begin with, the data in the report included numbers of modifications by users and by vendors. These figures included several instances where both the vendor and user modified a package, but these numbers weren't stated separately.

As a result, there were occasions where the total number of modifications of a given package exceeded the reported number of total responses.

Therefore, the published figures were adjusted to account for this discrepancy, as well as for the case where the number of modifications plus the number of no modification was less than the total number of responses. These adjustments are reflected in the tables.

Table 1. All Users

Class	Number of Pkgs.	(A) Total Number of User Responses (B) + (C)	(B) Number Who Did Not Require Modification	(C) Number Who Required Modification	(D) % Who Required Modification (C/A)x100	(E) Total Cost	(F) Average Cost to Users Who Required Modification (E/C)	(G) Expected Value of Modification (E/A)
System	37	1,081	761	320	30	$1,320,371	$4,126	$1,221
Application	29	413	88	325	77	1,505,180	4,631	3,645
Data Base Management System	6	191	133	58	30	247,458	4,267	1,296
Sort	7	149	120	29	19	6,300	217	42
Compiler	4	115	69	46	40	2,341	49	20
TOTAL	83	1,949	1,171	778	40	$3,081,650	$3,961	$1,581

Table 2. All Users Except IBM, CICS and MSA Payroll

Class	Number of Pkgs.	(A) Total Number of User Responses (B) + (C)	(B) Number Who Did Not Require Modification	(C) Number Who Required Modification	(D) % Who Required Modification (C/A)x100	(E) Total Cost	(F) Average Cost to Users Who Required Modification (E/C)	(G) Expected Value of Modification (E/A)	
System	36	945	702	243	26	$537,281	$2,211	$569	CICS Removed
Application	28	369	81	288	78	943,853	3,277	2,558	MSA Payroll Removed
Data Base Management System	6	191	133	58	30	247,458	4,267	1,296	
Sort	7	149	120	29	19	6,300	217	42	
Compiler	4	115	69	46	40	2,341	49	20	
TOTAL	81	1,769	1,105	664	38	$1,737,233	$2,616	$982	

Table 3. Datapro Honor Roll

Class	Number of Pkgs.	(A) Total Number of User Responses (B) + (C)	(B) Number Who Did Not Require Modification	(C) Number Who Required Modification	(D) % Who Required Modification (C/A)x100	(E) Total Cost	(F) Average Cost to Users Who Required Modification (E/C)	(G) Expected Value of Modification (E/A)
System	12	491	411	80	16	$22,896	$286	$47
Application	2	35	23	12	34	1,600	133	46
Data Base Management System	0	–	–	–	–	–	–	–
Sort	3	49	39	10	20	140	14	3
Compiler	1	7	6	1	14	0	0	0
TOTAL	18	582	479	103	18	$24,636	$239	$42

Table 4. All IBM Packages

Class	Number of Pkgs.	(A) Total Number of User Responses (B) + (C)	(B) Number Who Did Not Require Modification	(C) Number Who Required Modification	(D) % Who Required Modification (C/A) x100	(E) Total Cost	(F) Average Cost to Users Who Required Modification (E/C)	(G) Expected Value of Modification (E/A)
System	3	216	119	97	45	$873,528	$9,005	$4,044
Application	10	174	11	163	94	436,771	2,679	2,510
Data Base Management System	2	60	37	23	38	100,619	4,375	1,677
Sort	3	94	75	19	20	6,160	324	66
Compiler	3	108	63	45	42	2,341	52	22
TOTAL	21	652	305	347	53	$1,419,419	$4,091	$ 2,177

Table 5. All IBM Packages Except CICS

Class	Number of Pkgs.	(A) Total Number of User Responses (B) + (C)	(B) Number Who Did Not Require Modification	(C) Number Who Required Modification	(D) % Who Required Modification (C/A)x100	(E) Total Cost	(F) Average Cost to Users Who Required Modification (E/C)	(G) Expected Value of Modification (E/A)	
System	2	80	60	20	25	$90,438	$4,522	$1,130	CICS Removed
Application	10	174	11	163	94	436,771	2,680	2,510	
Data Base Management System	2	60	37	23	38	100,619	4,375	1,677	
Sort	3	94	75	19	20	6,160	324	66	
Compiler	3	108	63	45	42	2,341	52	22	
TOTAL	20	516	246	270	52	$636,329	$2,357	$1,233	

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Modifies Evaluation Procedures

Firm Gets Pension Plan Package Running on Schedule

By Don Leavitt
Of the CW Staff

HOUSTON – Most industry observers argue – with a good deal of validity – that installations should follow a well-ordered, "scientific" approach whenever they evaluate a software package for possible acquisition.

But there are times when the established approach just can't be used.

A change may still provide a valid solution to the problem, however, if the substitute procedure is as orderly as the original. A case in point is the recent experience of Lynn Hodge, a project manager at Occidental Petroleum corporate headquarters here.

Like most other U.S. corporations, Occidental is now subject to the provisions of the Employee Retirement Income Security Act (Erisa) under wich Congress mandated specific, stringent recordkeeping for most pension plans. The effective date for at least part of the act's provisions was January 1.

Hodge spent about a month last autumn researching the provisions of Erisa and looking into what programs Occidental already had in place at its corporate data center. If existing programs couldn't be modified, he realized, a massive in-house redesign and reprogramming project might be the only alternative.

Time a Consideration

Time was pressing. Instead of putting together a checklist of logical capabilities and system requirements a package should meet, as Occidental would normally do, Hodge defined what the redesign effort would cost if Occidental did the work in-house and what the desired system must contain once the effort was complete.

He contacted various vendors he thought might be able to help, but with little success. Then both he and his boss saw an ad for Wang's Super package, which includes an Erisa-compliance subsystem. Approaching his problem from what he termed "a very personal standpoint," Hodge flew to Boston to talk to Wang.

He sat down with Wang personnel and got an overview of the pension system and dug a bit further "to see what it was really like." He took his estimate of in-house development costs and requirements and talked with Wang's Erisa system manager, Bob LaFleur.

"Can your system provide what we need?" he wanted to know. And after studying the package features, the answer seemed to be "Yes, the system can handle about 95% of Occidental requirements immediately." The remaining needs could be met, LaFleur told Hodge, with only minor changes to the normal Wang-provided coding.

One of the items the off-the-shelf system could not handle, Hodge explained, was a customized employee benefit statement. This is a legal-sized preprinted form on which Occidental wanted to insert dollar values and other figures to define benefits accumulated by the employee to whom the statement was addressed.

Wang "couldn't provide that directly through the system, but it said it could set up a [magnetic] tape with the data on it," Hodge said. "Then all we have to do is reformat the tape and run it against a print routine," so even that problem was under control.

Clean Coding

Occidental's project manager had been a programmer for four or five years. As part of his review of the package with Wang, he was shown a good bit of the source coding and this, he reported, was "very clean," while the system design was "very flexible."

With "something like 200" different pension plans in effect throughout Occidental, he found changes in the formulas could be entered very simply on the Wang system. Further, the individual employee records on the system are variable in

(Continued on Page S/25)

The 'Normal' Method

HOUSTON – A study committee at Occidental Petroleum headquarters here is following the company's normal procedures to evaluate various payroll and personnel accounting packages, according to Lynn Hodge, area project manager for corporate systems.

This "normal" procedure entails creating a checklist of application features the software under study should have and system-oriented requirements it must meet.

In the first instance, a particular report might be very desirable but not really critical. In the second range of considerations, however, the package must be able to run under the OS/MVT environment utilized by Occidental.

Hodge is not on the payroll/personnel system evaluation team, but he said that, if the checklist is typical, it does not include weighted values on any of the items. Vendors are asked simply if their product can provide thus-and-so or can be modified to produce the desired result.

In late January when Hodge described his "personal" search for a pension package (see accompanying story) and the related quest for payroll and personnel software, a number of vendors had responded to the checklist. From these, the five or six packages with the most positive fit to the Occidental requirements would be selected as "semifinalists."

The vendors of the packages in that select group would then be asked to make live presentations at Occidental headquarters. But the presentations would be interactive sessions, with representatives from the payroll department and personnel offices present along with technicians from the DP staff to pick the vendors' brains, Hodge said.

(Continued on Page S/25)

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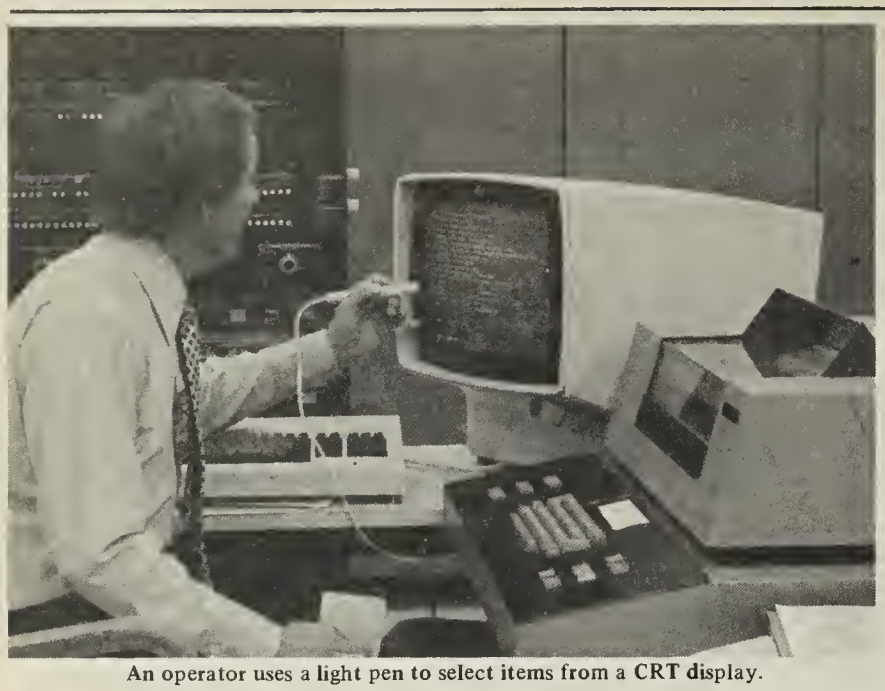
An operator uses a light pen to select items from a CRT display.

Instrument Firm Uses Packages As Effective Tools in Many Ways

(Continued from Page S/5)

ped terminal and keys in requested information shown on the CRT display.

JCL is in the system in three minutes or less. If an error is made, the programmer knows about it immediately and can correct it on the spot.

Losing Touch

There is a problem, however, inherent in such automatic generation of JCL, Dupon said: programmers lose touch with the details of JCL coding and have a tough time when they go away to a school in which they are expected to know how and why the various parameters work.

Roscoe's direct-access conversational data entry features automatically give the sequence of information that is needed, and that information goes directly to the system without stops and delays usually associated with manual data entry.

Dupon credits these features with many of the dramatic savings in time and increases in efficiency through reduced coding time, reduced programmer keying time, reduction of manual operations, less waiting for data entry, fewer chances for error and reduction of error-correction time.

"By using the syntax checker," he explained, "we no longer have to wait while we resubmit a job two or three times trying to get all the little nits out of it. If the programmer does make a mistake in entering a job in the first place, he knows about it right away and can correct it on the spot."

Roscoe was easy to install. Dupon felt it might take four months to get the company's programmers familiar with Roscoe procedures. However, they took to it immediately. They liked it and used it as an effective tool right from the start.

Creation of IBM's Customer Information Control System (CICS) source text through Roscoe's conversational procedures allowed programmers to get in and prepare many programs more quickly.

Although there never had been a head crash at L&N, Roscoe procedures for data set space allocation have been set up to make recovery faster and under complete control.

However, Roscoe was not L&N's first experience with ADR software products.

Years ago, L&N had its own system to safeguard the maintenance and retrieval of applications programs. When operating systems were converted from DOS to OS/VS1, ADR's Librarian was installed. It was expected to do everything the old system did and much more. Most importantly, it could be put into operation with no lost time and without major procedural changes.

Right Around Corner

L&N has an organized procedure for evaluating packages from outside sources, and Librarian scored well, but the company chose it rather than Panvalet from Pansophic Systems, Dupon said, "Mostly because ADR was right around the corner from us and had been very helpful when we were starting with Autoflow."

ADR's Metacobol has also played a key part in L&N's conversion and upgrading program, which required conversion from DOS to OS ANS Cobol. Without Metacobol, Dupon estimated it would have taken eight months to convert the more than 1,500 Cobol programs in use. Metacobol was installed and 80% of the conversion to OS/VS1 was completed in less than three months.

"We figured 10% of the programs might have to have some manual intervention in the code conversion. We were happily surprised to find out that we had to touch less than 1%," Dupon said.

"We reached a point in the conversion cycle where we took DOS programs, fed them into Metacobol and took them through the compiler, link edited them and had them ready to go. All we had to do then was create the conversion JCL."

L&N has in effect put Autoflow "on the shelf" since flowcharting is not required as documentation any more.

On the other hand, the company has recently been the Beta test site for ADR's Look, and Dupon likes that package's capabilities. It resides in the CPU with the production job stream, monitors the execution, allows the operator to intervene as needed and documents the entire operation.

L&N has used software monitors, but Look seemed more useful to Dupon since it supplies "snapshots" of immediate problems and supports immediate solutions.

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In Selecting Systems House

Guidelines Helpful to First-Time Users

By Don Leavitt
Of the CW Staff

RIVERSIDE, Conn. – How can a first-time user figure out which of several systems houses he may be considering is any good? And what do the user and the systems house have to do once they decide to get together?

Those are tough questions, John W. Oplinger, publisher of the *Minicomputer Software Directory*, said recently.

They are especially difficult questions for the "brand-spanking-new" user or potential user who has never touched a computer, has no knowledge about the things and isn't really interested in learning about them, the publisher added.

This kind of user wants to have a computer installed for a very specific set of business problems he faces and, though he may know his own business, "he's the most naive and the most vulnerable client a systems house will ever have," Oplinger said.

"First of all, I don't think he understands that finding the right systems house is a problem. What he knows about computers is what he's heard or read strictly as a layman."

User Getting Help

But the user is getting help in this area: Oplinger noted that systems houses are approaching the new user through his trade associations, technical publications and industrial shows.

Perhaps this exposure, supplemented by traditional direct-mail appeals – "if he takes the time to read through the pile of stuff that comes across his desk" – will encourage the naive first-time user to look at sources of data processing support in the same way he evaluates support for other activities.

He has to avoid being "snowed" by any part of the move to DP and perhaps to a systems house, Oplinger said, adding that this need not be a difficult operation to envision, although many of the details can be quite difficult.

"The only way I know is for the user to do what he would do if he was buying any other major item for his company," he said.

"How would he evaluate another piece of capital equipment of the same cost?"

'This kind of user wants to have a computer installed for a very specific set of business problems he faces and, though he may know his own business, "he's the most naive and the most vulnerable client a systems house will ever have."'

Though that sounds almost like a platitude, the publisher recognized an immediate problem: the user "has no good basis from which to work."

If the user's buying a piece of manufacturing equipment, he usually has a personal background that would be helpful in evaluating new choices, or the user would at least know how to organize a review of the companies and suppliers of the kind of equipment he wants, Oplinger said.

Part of the problem is that the user doesn't necessarily know what he wants the system to do or what the computer can do for him.

Does he want to simply transfer a manual or semiautomated system to the computer? Or would he want to modify his current business practices and procedures – perhaps to take advantage of some DP capability he didn't even know about?

Even if the first-time user has a fairly good idea of what he would like to do with a computer, the hardware specifications of competing systems are difficult if not impossible to compare objectively, Oplinger said.

"What do differences in disk speed, core size or data-word size mean?" he asked, noting that, especially for the novice, the whole problem is a "Chinese menu of things."

Recognizing the Problem

The better systems houses are recognizing this problem faced by the user. With no mention of what computer, operating system, peripherals or programming language they use, they offer the user a system that will perform "the following operations for your business," after which they cite the programmed applications they have available.

That is one way – "and not necessarily a bad one" – to move a new user to a computerized system, but more common is the situation in which someone from a systems house will ask the user what he wants done and will respond after some discussion with a proposal saying the house can set up a system to do the job.

The systems house will guarantee it will run and that it will get the work done in six hours, for example, instead of the eight hours the user now spends.

Even if the project is envisioned by the user as an almost direct transfer of a manual system, various advantages will probably be gained beyond a mere speed-up of the operation.

The integration of applications is one such likely by-product, brought about by the basic process of thinking about the application(s) that are going on the computer.

Easier work for the operators or clerks who run the work should be another gain, and easier inquiries against the files behind the work should be still another, Oplinger said. If the potential for these advantages seems apparent to the user from what the vendor is offering, more technical discussions are probably worthwhile, he added.

Outside Checking Important

Meanwhile, however, the user should be doing some outside checking. There is nothing wrong with checking the credit ratings of the systems house – "your friendly banker can usually be very helpful in this" – and with talking to previous or other current clients of the vendor.

No matter how good the proposed system sounds, if the vendor can't deliver for any reason – business failure or technical incompetence – the user had better know it ahead of time, Oplinger said.

In conjunction with the evaluation of the systems house, the user should make it a point of asking for the resumes of those technicians who will actually do the programming or hardware/software integration for the vendor.

And these resumes should be reviewed, with references and past employers, just as diligently as if the people involved were being considered for employment by the user – because that is exactly what the user is contemplating, even if on a temporary basis, Oplinger stressed.

Businessmen or 'Computer Freaks'?

"Don't take resumes from the owners of the systems houses – unless they expect to do your work themselves," he warned.

(Continued on Page S/31)

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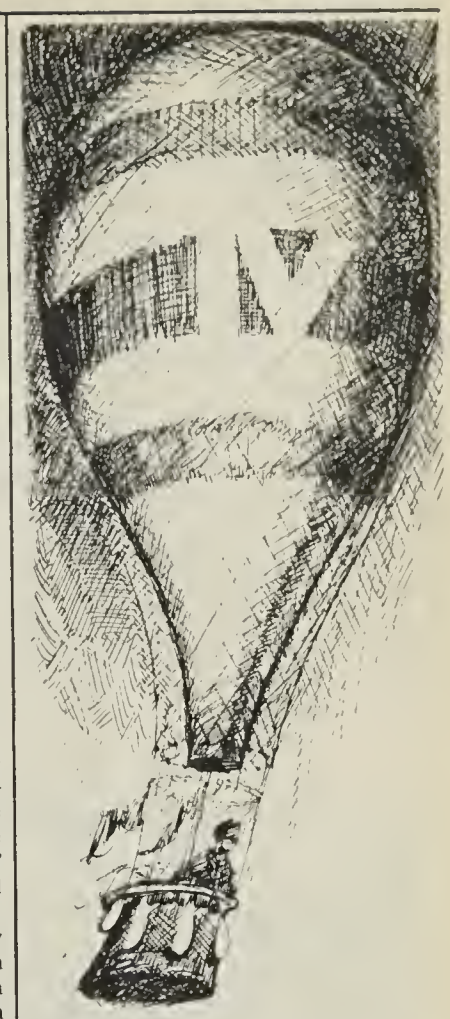

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Lists Sources, Criteria

Booklet Describes Process of Selecting Software

(Continued from Page S/2)

vendor's contract, a price list and some user references "preferably in a like industry to yours," Welke said. In an appendix, he has included a sample RFP.

User References

The list of user references is "probably the most important" thing the vendor sends back in response to an RFP, but "before you contact anyone on that list," the author warned, "carefully prepare a written list of the questions or information you wish to gather from each."

"If you merely ask if he 'likes the package,' you are likely to get a similarly inane reply. What you want are specific responses, the kind you get only when you ask specific questions," Welke said.

Again, as with the RFP, he included a sample list of questions that might be appropriate for interviews with users.

When the time comes for a technical review evaluation of the software being considered, users must recognize that different kinds of tests apply, depending on the type of software involved.

Welke noted that operating system enhancements, programmer aids and similar packages can be tried for 15 to 30 days, "then if you don't like them, throw them out."

On the other hand, it is the accuracy of the algorithm that determines the acceptability of algorithmic-based programs, he reminded his readers. "That means running some test cases and comparing [the actual results] with predetermined answers."

Data-based applications can well pose the greatest problem, and these are the ones that require some type of benchmark or acceptance test, Welke said.

The elements of the benchmark or acceptance test will have to be devised by the user, unless the vendor has seen fit to construct something that is adequate, he said.

The need for a new test can be lessened to the extent that a thorough demonstration is provided by either the vendor or one of his existing customers, the booklet added.

Demonstration a Must

"On that point, no software package, regardless of form or purpose, should ever be purchased without being demonstrated," Welke said in some of the strongest language used in his rather casual presentation.

"Of all things that software is not, it IS demonstrable and, as such, allows you the exercise of a perfect hedge in your buying practice."

The demonstration should involve all parties who will be concerned if the package is acquired, and each participant should prepare a written report of what he saw. "DP operations, the end-using department, the manager of I/O control, maybe even the keypunch supervisor and an auditor – all should probably be present, because each can contribute a different viewpoint," the consultant/publisher continued.

'Serious Departure'

User installations buying their first software package must recognize this is a "serious departure" from previous practice and there are some administrative and personnel factors that must be taken into account, Welke said.

The selection of the individual to be involved in choosing the package is of "critical importance," but, he warned, "it can never be anyone who has a vested interest in either doing or not doing the project in-house."

Further, the most common error made in software acquisition, from an administrative point of view, is not keeping or getting written records, reports, reactions, etc., he said.

"Someone should pass a law that says 'Starting right now, everything about this project will be put into writing,'" he said, adding that that simple procedure would eliminate "untold hours of hassle and misunderstanding."

Once again, instead of relying on his words alone to get users to do things, Welke has included a series of sample forms to document the user's characteristics, profiles of the vendor and the product and to list documentation provided with the product.

Economic Consideration

Economic considerations are important, but Welke put them after the technical evaluation. If the product does not and cannot perform, the cost is immaterial.

In any case, the total costs of the project include not only the cost of the software to be acquired and the resultant installation expenses, but the cost incurred internally to accommodate the system in question and the costs of conversion, he reminded his readers.

After a short discussion and reviews of "what to tell your vendor" and the characteristics of a good software vendor, he concluded with an upbeat thought.

"Armed with all of the above and a fighting spirit, you too can mount a successful . . . campaign. The whole effort will undoubtedly be good for the company, look splendid on your resume, and," going back to the way he opened the booklet, "even be a bit of fun in the process."

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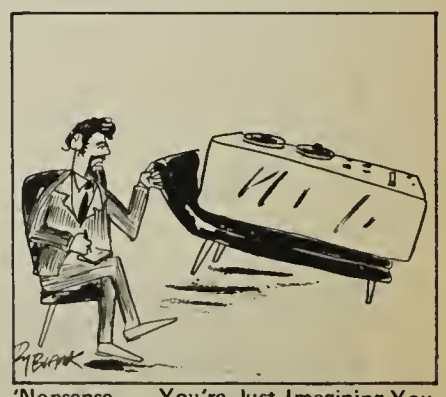

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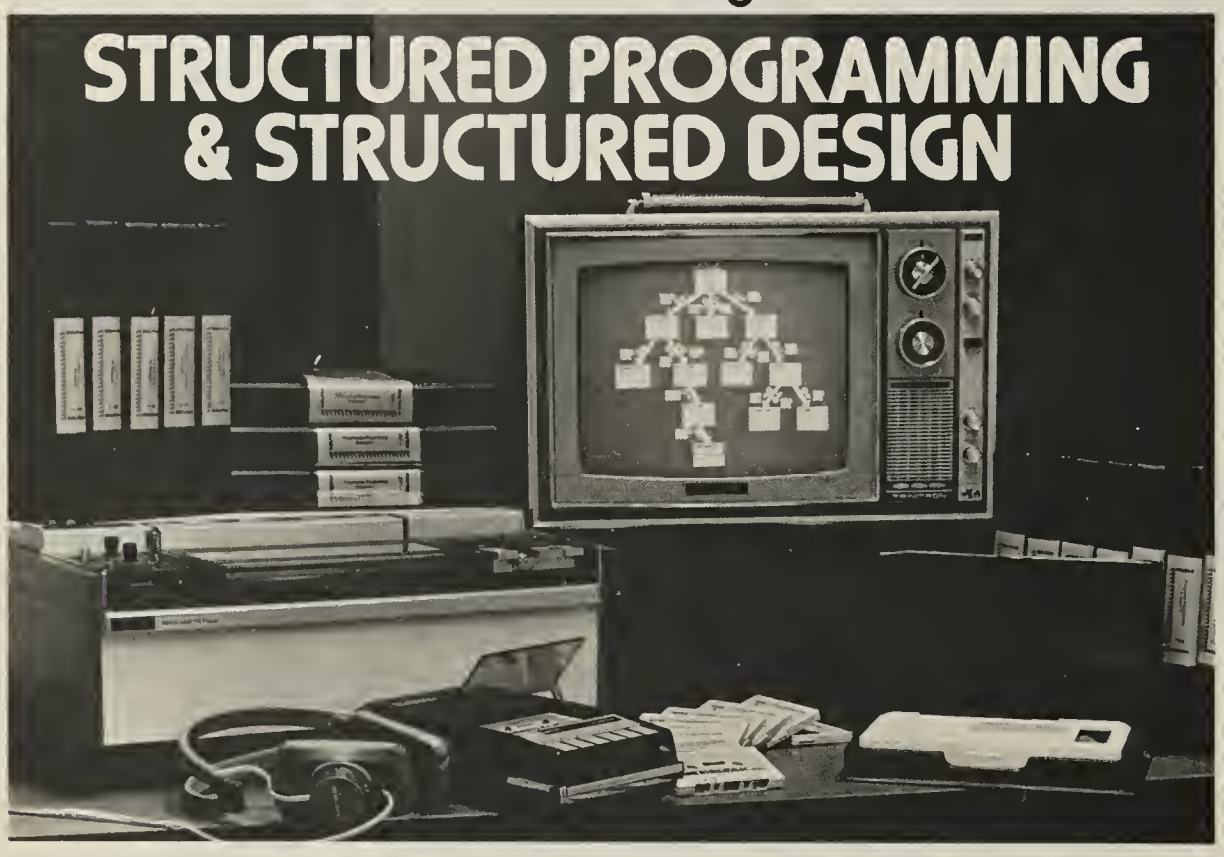

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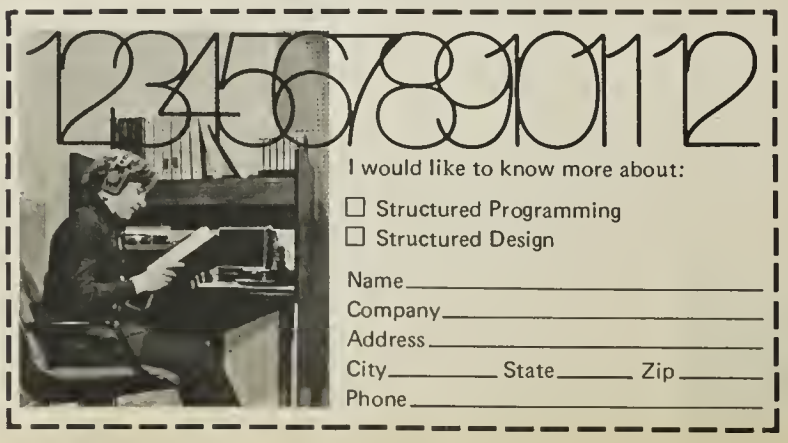

Package Produces Timely Reports for Oil Researchers

DENVER – Large governments and large industries both require vast amounts of information upon which to make decisions and base courses of action.

Each time a desperate situation arises, there are hundreds of agencies that require data, no two needing the same set of facts and no two wanting their summations in the same format.

For more than 45 years Petroleum Information Corp. (PI) based here has been collecting data on the oil wells of the U.S.

Even when it started the job in 1928, PI had to delve into some rapidly disappearing history as well as keep up with the steady growth of field after field.

But persistence paid off and the files grew. As a result, it now has a data base that contains a large set of facts on each of more than 800,000 wells. Even in an industry traditionally geared to thinking big, this is a staggering number of oil wells.

Maintaining a file of this size is an incredible job; retrieving data from it quickly and completely is almost an insurmountable one.

Fortunately, most clients served by PI wanted periodic reports on only a few items and the staff could keep up with them.

As improved techniques became available, PI incorporated them into its standard procedure. Finally it had a fully computerized system and thought it was ahead of the game for a while.

Energy Crisis Strikes

Then the public became aware of the "Energy Crisis."

For years PI's client list was made up chiefly of major oil firms and independent drillers. What they wanted was merely a summary of current operations.

Suddenly the client list expanded to include leading institutions, stock brokers, government agencies, petrochemical firms, equipment manufacturers and everyone else who felt a need for facts about American petroleum production.

This increased activity probably delighted the sales force of PI; it certainly threw a greatly increased load on the company's programmers.

A major portion of the new clients wanted special reports, strange juxtapositions of data against data, searches into long-dormant records.

PI's management solved this problem by taking two nonprogrammers with expertise in pertinent fields and saying, in effect: "Here are our facilities. Find a way to generate these special reports and still keep up with current updates in the files."

It is a technique that is not recommended to everyone, but in this case it worked.

Jack Dieball had been a statistician and Earl Brookshire was a petroleum industry consultant of long standing.

The facilities placed at their disposal included an IBM System 370/145, Release 31 of DOS, master history files on more than 800,000 wells, a network of field offices that relayed information to Denver every week and a hint that results were more important than traditional procedures.

A programmer would have been appalled at the assignment. Dieball and Brookshire tackled it.

The first job was to learn how to maintain the new information file. Every week they received reports on the status of wells being drilled, capped, put into operation or closed down.

The weekly statistical run logs 28 items of information on each of some 700 wells.

This is the basis of the weekly report PI sends to its subscribers. Data received by Friday of any week must be ready for inclusion in the report printed the following Wednesday.

It proved to be a good introduction to the new job. They learned the composition of the files and the basic techniques of handling data.

Software Package Sought

During this time, Dieball began to look for a software package that would get reports out on short notice. Much of the production programming at PI is in Cobol which, Dieball soon realized, did not have the flexibility he needed for the short one-time runs the new clients wanted.

His first try at finding a package from an outside software vendor was "not encouraging," but then an associate suggested DYL-260, a report-generating system from Dylakor Software Systems, Inc. which he had used in situations similar to Dieball's.

DYL-260 is specifically designed to simplify the amount of programming effort required to create new files, reformat data and write reports. These tasks were precisely what much of Dieball's job had become. So he bought the package.

An impressive amount of increased revenue at PI has come from this relatively new field of special report production, and these are all generated with DYL-260.

In the year Dieball has been using it, he has written more than 120 programs, which is an indication of its efficiency as well as of the erstwhile statistician's workload.

Primary Requirement Speed

The primary requirement of many of these jobs is speed. It sometimes seems large companies have corporate policies that prevent their staffs from requesting information more than a week in advance of the date the report is due.

Why worry about time; it's all on that fast old computer of yours, isn't it? quipped a PI staffer.

Of course, some of the requests for speed are legitimate. Dieball and Brookshire have produced several reports for government agencies during the period when those agencies were unexpectedly placed in the spotlight. They sympathize with this and try to help.

They also understand that even the most alert corporate executives sometimes don't find out about a problem area they must discuss until the last minute.

But even a short report that requires some new selection of facts requires a lot of effort to acquire those facts in usable form.

The use of a highly efficient support package means more than the saving of many man-days of hard work and Dieball is definite on the importance of programming tools that save time.

He has looked at many other systems, none of which he will point a finger at, but he still prefers DYL-260.

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Two Methods of Package Selection Work Well for Firm

(Continued from Page S/4)

them to S&H, and "fairly quickly" pared the list down to four candidates: Data Analyzer from Program Products, Inc.; Mark IV from Informatics, Inc.; Generalized Information System (GIS) from IBM; and Asi-st.

It defined a problem, based on S&H's own data tapes, and submitted it to each of the four vendors. It was not a timed test, Rauch noted: "We were looking for function performance more than time or cost savings. Would it really do the kinds of extractions we needed, and produce readable reports?"

Unfortunately for Data Analyzer, the S&H team realized about half-way through the test period that file maintenance support had to be a requirement.

"At least at that time," Rauch said, "Data Analyzer just didn't have that capability. The vendor tried to 'jury-rig' something but it didn't stand up, and that eliminated that package."

IBM was slow in submitting its test results based on GIS and that, according to Rauch, was also unfortunate. He "kind of leaned to" this package because it allowed freeform rather than structured input, but the IBM test results didn't get back to S&H until two months after Asi-st had been installed.

The Final Test

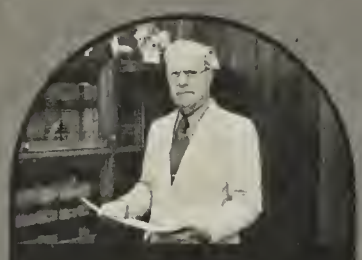
Before it was chosen, however, Asi-st had to pass one test beyond the function performance demonstration. When the competition got down to Asi-st and Mark IV, Rauch had "end-user types," not members of his selection team, visit existing user sites.

They were free to ask what questions they wanted and they were "probably problem-related rather than technical in nature," the S&H spokesman noted. As far as Rauch was concerned, these users were encouraged to think about what they, as users, could contribute to the selection process.

The screening led to a memorandum, on the director's desk on the date requested, saying " 'here's what we recommend. Here is an outline of why we make this recommendation. And the complete "white paper" documenting the recommendation will follow,' " Rauch said. The recommendation and subsequent decision was in favor of Asi-st.

The package has been in use at S&H for some time now "with outstanding success," Rauch said. Though some thought was originally given to making the package's capabilities directly available to end users, this has not "and probably will not happen. We use it strictly within the DP department, in response to user needs," Rauch said.

A Capsule Report from Entrex Key-Disk Users...



Concurrent Data Entry

"In Charlotte County, the Sheriff's Office retrieves tag registration data, the Tax Collector posts the latest real estate tax payments, the Assessor calculates land values, while my department is printing out paychecks for all of them."

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—John R. Steiger, Manager of Management Information Systems VanTyper Division, Addressograph Multigraph Corp. East Hanover, New Jersey

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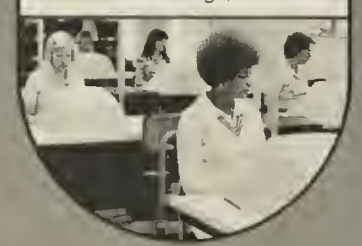
"The batch balancing, conditional verification, and data generation features of the ENTREX System have doubled our productivity."

—R J. Denton, Vice President, Bancshares Dataline Corporation Chattanooga, Tennessee



System Compatibility

"ENTREX's system compatibility allowed me to upgrade from System 380 to System 480 with minimal reprogramming and no disruption to productivity."

—Bill Pearce, Data Entry Manager, Data Processing of the South, Inc. Charlotte, North Carolina

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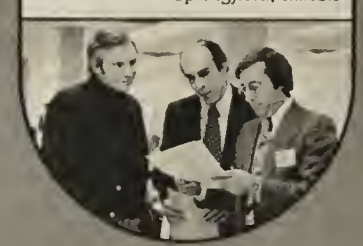
"The Department of Public Aid has cut mainframe processing time in half by pre-processing data on the ENTREX System."

—Garry E. Paddick, Chief, Bureau of Information Services Illinois Department of Public Aid Springfield, Illinois



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Package Reduces Plant Lead Times

(Continued from Page S/6)

encountered in the installation and its operation.

The data used by the system had been in use for some time allowing data problems to be identified and corrected before installation of MRP.

Also, functional personnel had been oriented to a mechanized inventory conversational planning system and were accustomed to output similar to that of MRP.

Functional supervisors were intimately involved in the systems modifications, and extensive training sessions were conducted by functional supervisors with functional personnel.

Key in-house systems personnel participated in the modifications, provided guidance in the data base and systems interface areas.

Rath & Strong personnel were directly involved in the modification program at the technical-application, project-management and user-education levels.

Everyone seemed to agree that Pios was a logical and technically sound MRP net-change system.

Conversion Went Smoothly

Through the nine months of working with Rath & Strong, people lost their tempers, accusations were made and worked out and schedules were delayed. Yet the job was successfully carried out, and the final conversion went smoothly – a conversion that takes many similar companies two or three times as long with two to three times the cost.

The task force deserved considerable credit in overcoming these difficulties. The task force met weekly to review the program and break bottlenecks, make systems decisions, establish priorities, reassign personnel and revise schedules.

It is expected that the effect of the net-change MRP system will not be fully reflected until sometime this year when inventory turnovers of a major product line will increase to 2.35 from the 2.1 previously achieved.

The avoided capital investment due to this increase in turnover is expected to be in the area of $2.8 million or a total of $5.6 million for one product line.

Increases in turnover are also projected for 1977 and 1978, resulting in an even greater avoided capital investment.

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With Firm's 1,200 Cobol Programs

Packages, Standards Aid DOS/VS to OS/VS Switch

By Don Leavitt
Of the CW Staff

AUBURNDALE, Mass. – Good internal standards and a series of packages seemed to have made all the difference last year when Allied Data Utility was faced with converting some 1,200 Cobol programs – and its JCL – from DOS/VS to OS/VS.

A subsidiary of Allied Stores Corp., the company supplements and may ultimately supplant various Allied DP centers around the country. In last year's effort, it was consolidating a New York center into its existing workload, replacing an IBM 370/135 and a 145 (each under DOS/VS) with a 1.5M-byte 158 running under OS/VS1.

But Allied Data Utility was lucky, according to Bob Waterhouse, the manager of development and programming. Even before the changeover, 95% of the programs in its library were ANS Cobol and the rest were Assembler.

Much of the coding, therefore, could be transferred to the new environment with little modification, he noted.

Overwhelmed at First

Even so, the sheer size of the undertaking seemed overwhelming. Waterhouse didn't think he had staff enough to do the work on a timely basis, and bids from outside seemed much higher than the firm could justify.

Ultimately, however, the work was done in-house with substantial help from some software packages and their developer. And the project cost less than half the amount Waterhouse estimated – less than 40% of what the outside firms bid for the work.

Waterhouse has three programmer/analysts and one full-time systems analyst. He estimated doing the conversion in-house "with no computer assistance, no packages" would take six to eight months with six to eight people.

When he sought help from outside sources, one contract programming house bid for the job for $235,000 "and it wanted two of our people with it throughout the conversion." He took that bid to Jordan Marsh, one of the Allied department stores and Allied Data Utility's biggest customer, and said he could do the job in-house for $180,000.

Standards Credited

With the programs he finally gathered, Waterhouse and his staff were able to do the job easily in less than six months and bill Jordan Marsh "about $90,000." That, he admitted, was somewhat more than the actual costs incurred for the entire project.

"We were using fairly good standards, not only in programming but also in the DOS JCL," so there was an order to what the center already had, he added.

The standards came into being largely because Waterhouse's shop has used an evolving set of packages from Arkay Computer Applications of Lowell, Mass., and the Epat tape library management and control package from Software Design, Inc.

The Arkay packages began with one called Mecca Standards. This analyzes a user's Cobol program and reports to management (and the programmer) where installation-defined standards have been violated. That gave Waterhouse the starting point he needed.

From the violation-reporting system, Arkay developed Focus, which formats the user's source code along standardized lines including the indenting of subsidiary logic. So the standards were not only developed with violations reported; they were enforced.

That capability then grew into a Cobol source code conversion package designed not only to reformat as necessary but to revise coding when the compiler on the target machine differs from the one on the input machine.

If coding can not be converted directly, the system is geared to flagging the problem statements on a WAS/IS list generated to show input and output.

Developed Conversion Package

And finally, Arkay developed a JCL conversion package to take care of that part of the changeover. Even this is being modified now by Robert Kahn (the "RK" of Arkay Computing), who worked with Waterhouse at the Allied installation.

Kahn is building a front end that will accept definitions of what the OS JCL should do and will process that input into the desired JCL output, rather than working with what in some users' shops is "pretty lousy DOS JCL," in Waterhouse's words.

But Allied's JCL was reasonably good even before the big shift. Under Epat, "we didn't have things like 'Sorted Transactions' for a file identification," Waterhouse explained. "We had a system that told us exactly what program had created the tape, and what it was, just by looking at the standardized file ID."

On disk drives, the center had much the same thing. It had a label that immediately and unambiguously told what program had created the data set on that disk.

The installation isn't using Epat anymore, Waterhouse added. "It's only for a DOS environment." Instead the center acquired UCC One, a tape library system from University Computing, and that seems to be doing fine in the new operating environment.

Illustrating the capabilities of Arkay's Cobol conversion, Waterhouse said that concurrent with the change from DOS/VS to OS/VS, he wanted to rework some basic program logic so that things were moved in and out of Working Storage instead of in and out of the files directly.

Avoiding use of the file sections for actual logic processing "has saved us a lot of headaches," he said, but the converter by itself could not recode the original programs to run through Working Storage. Instead the package printed the problem instructions with appropriate flags.

Waterhouse was able to see what needed

(Continued on Page S/31)

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Package Lets Auditors Work Independently of DPers

By Tom Lokey
Special to Computerworld

AUSTIN, Texas – If an audit of data processing functions, procedures and daily input is to be valid at all in a bank, the audit must be done without direct DP personnel involvement.

It must be done quickly, and it must be done with pinpoint accuracy. Those goals have been stated many times before, but what has not been clearly explained is how people of little or no DP expertise are to accomplish those goals.

I have found a way.

My situation was almost classic. Picture an Air Force colonel who had spent most of his working years as a nuclear weapons officer, retired at 45 and out looking for a job. He applies for a position on the audit staff of Austin National Bank (ANB) and is introduced to the computer for the first time.

I got the job, learned some Assembler and attempted to do an audit. I did not feel expert.

It was about then the auditing staff began to search for software assistance. Our requirements were basic: We had to be able to program our own reports and the system had to be compatible with currently installed IBM equipment.

Our search ended with Easytrieve from Pansophic Systems. The system is basically a report generator, but it has other features that allow us to audit through the computer, absolutely the best kind of audit there is. That was three years ago. Today, we use Easytrieve for every application in the book.

Easy to Use

It is easy to use and to apply to many situations. The coding is basically English. Most report formatting is done automatically, which saves a lot of aggravation.

One command will ensure that subtotals will appear at the places we want them. Another command applies the random number generator to obtain any specific sample size.

When running an audit program, we read in the proper card deck and watch the program run. Though Easytrieve has the capability of storing programs under a unique name, or macro, we feel that we maintain audit program integrity by simply using our program deck and running it each time it is required.

We know exactly what goes in, for it is recorded on the output. We then know that the report that comes out will be valid. Easytrieve programs are so short that we can store them easily – much more practical than if done in Assembler.

The newest version of Easytrieve has a PRINT command that allows us to do audit confirmation letters, preprinted forms and other specialized printing tasks.

We can couple a computerized letter with the random sampler and get letters written to a specific percentage of customers with balances and addresses all included and correct.

Then, by merely specifying the word LABELS, Easytrieve will produce mailing labels to get the whole job out the door.

Other Applications

That is only one of the system's applications. The audit staff at ANB also uses the system for special reports such as dormant account analysis, a particularly vulnerable area for fraudulent entries.

We analyze our commercial and installment loans to compute unearned discounts. We check thousands of commercial notes for balances; Easytrieve combs through the records and reports only the errors or accounts that don't balance.

We have found several strategic program errors this way. We also check key programs by running them on a test compilation of data. Easytrieve makes building a test file a minor task.

The system is easy enough for any department to use, but at ANB, the auditors, the accountants and the DP staff are the only users of the system.

The independence I have to be able to write my own jobs and run them on the computer adds a great deal to the credibility of my audits.

'Though Easytrieve has the capability of storing programs under a unique name, or macro, we feel that we maintain audit program integrity by simply using our program decks and running it each time it is required.'

The system's speed also gives me a high degree of security, for I can watch the reports being printed immediately after entering the job into the computer. There is no waiting, and the report is seen only by me.

When new people join my staff, the first thing I have them do is learn Easytrieve.

When the system representative from Pansophic originally trained the auditing staff here, we made a videotape of the presentation. With that tape and the user reference manual, anyone here can learn to use the system in a matter of days.

Using Easytrieve has not been an unruffled bed of roses. I have had some minor problems, as one does with any software. But Pansophic customer support is there when I need it. It has solved every problem I have ever had and done it fast.

That kind of support allows me to depend on time schedules, with miniscule chance of being held up by the software.

We pay a $750 annual maintenance fee for the service, but it's worth it many times over. Pansophic regularly updates the system to include features that auditors and other users have suggested.

Lokey is chief auditor at ANB.

'I Wasn't Even Replaced by a New Machine. They Just Put an Attachment on an Old One.'

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Changes Evaluation Methods

Firm Gets Pension Plan Package Up, Running On Time

(Continued from Page S/12)

length, permitting proper recording of changes from plan to plan if the worker moved from one division to another.

Part of Hodge's evaluation, a carryover from his usual procedures, was to get a list of users from Wang and to interview as many as seemed necessary. Since Wang had not yet installed any Erisa-compliance packages, the company provided the names of payroll and personnel system users.

This was acceptable to Hodge, who felt that, since all three systems interfaced in the Super package, they were probably all built with the same conceptual design.

Occidental contacted six current Wang customers across industry lines and got favorable responses from all six. So that seemed another reason to choose the Wang software.

But Hodge didn't stop there.

After visiting Wang, he went back to the other vendors to clarify what they had to offer. Most of them apparently didn't have a pension plan immediately available: "Generally they wanted to come into our shop and do a six- or 12-month study. Based on that, they would bring in their programmers and design a system from scratch," Hodge explained.

That was an approach Occidental could have used without outside studies and programmers – if there had been time. Beyond that, the vendors who proposed it generally wanted to tie the resulting pension software to their own personnel systems, which they would be glad to sell Occidental.

That conflicted with Occidental's plans to interface pension accounting with payroll and not personnel. Not all Occidental's divisions have personnel accounting systems, Hodge said. "So that just about ruled out all the vendors" except Wang.

Wang's program, already checked out at the technical level, had a fixed contract, clearly defined maintenance responsibilities "and it was cheaper than anyone else." But Hodge went further in his checking.

He took the documentation out to the company's actuaries and the manager of corporate benefits. Once they said it looked OK, he bought the package.

The package hasn't been installed yet on Occidental's large-scale IBM 370 mainframe, but the company is getting ready for the big day. Wang told Hodge it intends to install only two systems a month this year, and Occidental's target date is April 1.

Meanwhile, the company has established a steering committee made up of Hodge and representatives of Industrial Relations (IR) departments from each division within Occidental. The eight members of that group provide overall direction to the IR departments and to the project team which is handling the technical conversion problems.

The project team is made up of Hodge as project manager, a project leader on the corporate level and an analyst from each division. There's also a programmer assigned within each division to write special conversion routines and interfaces to existing payroll systems. And "someone familiar with personnel requirements" is also assigned within each division.

As area project manager for corporate systems, Hodge has a supervisor of programming under him. That supervisor has 12 people under him, and Hodge has five analysts so Hodge sounded confident his crew, the project team, the steering committee and Wang, all working together, would have the pension system running on schedule.

'Normal' Procedure Has Feature Checklist

(Continued from Page S/12)

Out of that, two will be chosen, and at that time Occidental staffers – again, from user departments as well as DP – will visit user sites, spending half a day or so at each location asking specific questions and gaining a general impression of how well the packages really are accepted on-site.

Only after the checklist, initial screening, intensive face-to-face vendor presentations and visits to the user sites does the study committee expect to make its final recommendation.

And this in turn faces the scrutiny of a corporate-level steering committee before a final buy/no-buy decision is made, Hodge noted.

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Packaged Support Frees Consultants of DP Drudgery

DALLAS — Sometimes users gain packaged software support even when they do not have a computer in-house.

Although computer-produced information is vital to Turner, Mason & Solomon (TM&S) for the advice it gives clients on petroleum and petrochemical processing, the firm of consulting engineers based here chose to be involved as little as possible with the details of data processing.

"Basically, what we have to sell is judgment," Harry F. Mason, a partner in the firm, said.

"We don't offer the ability to add numbers quickly or provide special computer programs. We leave data processing to others and concentrate our efforts on chemical engineering judgments."

Freed from DP Tasks

Thus removed from ordinary computing tasks and responsibilities, the firm can concentrate on its clients' requirements. Clients include numerous petroleum and petrochemical companies; government agencies; and the American Petroleum Institute, the industry trade organization. They range from small- and medium-size companies without planning and analysis staffs to large petroleum firms who will hire TM&S solely for independent appraisals of particular questions.

Staff consultants analyze computer output and interpret the calculations. This interpretation is a significant part of the judgment the firm sells.

Another Advantage

Another advantage of data processing, the firm has found, is the opportunity to evaluate a greater number of alternatives in their studies and do so faster than when this work was done by manual methods.

For several years the consulting firm has assigned its computer processing, programming and analyst projects to Control Data Corp.'s Cybernet data services network and systems analyst organization.

Early in this association, CDC converted all TM&S's linear programming models so they could operate on the large-scale CDC network computers.

"Today, if one of our models doesn't work right," Robert E. Cunningham, a TM&S engineer, added "we could dig out all the mathematical reasons and fix it ourselves. We've found, however, that it's faster and more efficient for our outside analysts to do the work."

Mason also feels it's more economical for the firm's clients when he uses this service than it would be if TM&S handled all programming details themselves.

Business Venture Analysis

An example of the studies performed by the TM&S organization is one client who first approached the firm requesting a new business venture analysis.

This study included evaluation of a refinery in the Rocky Mountains, earnings projections and operating cost estimates. As a result of the study, the client decided to purchase the refinery.

Next, the client asked TM&S to conduct a series of economic analyses to determine optimum refinery operation.

Sample Questions

Questions involved operating variables such as:

- Several kinds of crude oil are available at different prices. Which will produce the most economic yield of petroleum products?
- How can existing refining equipment be used most effectively?
- Can product specifications be changed to more accurately reflect consumer demands?
- How much of each product should be produced to meet both market requirements and corporate profit goals?

Later, the same client returned for a third time, requesting consulting services regarding a proposed expansion of its Rocky Mountain refinery.

The consulting firm examined the same questions that arose during its earlier studies on optimal operation, but added variables relating to stretching the output of some processes to their physical limits and adding new equipment.

The consultants performed these studies by processing a linear programming model of the refinery on a large-scale computer. TM&S consultants developed the model with help from a CDC systems analyst who devised an identification system for elements of the model that saved from 20% to 30% of the time it would have taken to run the model through the computer without the new approach.

The significance of this time-saving, according to Cunningham, is "it cuts costs appreciably and is especially worthwhile when you make a number of computer runs."

Following its expansion studies, the consulting firm also helped design some of the new equipment it recommended and acted as project manager, supervising the engineering contractor chosen for the job.

In most of its work, TM&S is under very critical time deadlines because of the nature of its clients' requests. This means, in turn, that results of data processing must be delivered consistently within established schedules.

"Simply stated," Mason concluded, "in some cases, if we and our suppliers did not meet schedules, the results of our analyses would be of no use to our clients whatsoever."

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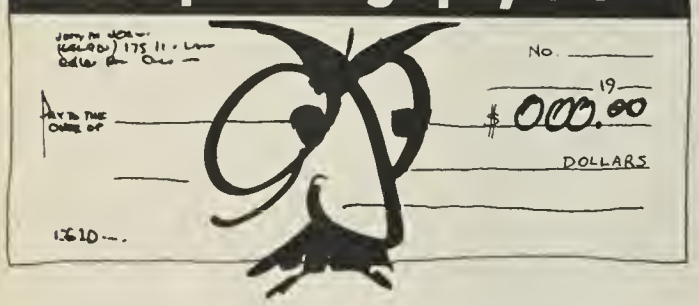

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Numerous Products on Market

Software Playing Vital Role in DP Auditing Methods

By Marianne Marino
Special to Computerworld

As management becomes increasingly convinced of the need to audit "through" the computer, DP audit techniques rely ever more heavily on the use of software to produce random samples, make comparisons and summarize exceptions from computer files.

This trend has not gone unnoticed by the software vendors, as witnessed by the numerous DP audit packages already on the market. One of the latest of these packages was introduced by Informatics, Inc., earlier this year.

Essentially, there are three categories of file retrieval/report generator software of interest to DP auditors:

- Software developed by a public accounting firm primarily for use by its own personnel.
- Software developed by independent vendors with features of special interest to auditors (i.e., EDP Auditor from Cullinane Corp., Cars-II from Computer Audit Systems, Inc.).
- Software developed by independent vendors for general use by the DP industry (i.e., Asi-st from Application Software, Inc., Mark IV from Informatics, DYL-260 from Dylakor Software).

Price varies widely from under $10,000 to more than $50,000. Core is another constraint, with some software requiring as little as 65K and others needing twice as much.

'If your DP audit staff is totally lacking in programming skills, it may be more cost-effective to purchase software geared specifically for the untutored DP auditor than to train him to use the software available in-house.'

The basic objective of these programs is to enable a user with little or no programming skill to produce reports with a minimum of coding. This is usually accomplished with a single pass of the file, although there are differences in the types and number of files which may be input and the number of reports which can be output on a single pass.

Additionally, a wide selection of automated features grace each package, including items such as stratified sampling, standard deviation, averaging, aging, table handling, subtotals, file footing, random number generation and more.

Guidelines in Order

Faced with such a plethora of variables, the DP auditor can no longer afford "seat-of-the-pants" decision making. Some guidelines appear to be in order.

- Take stock of your DP shop. Most DP departments have a variety of utilities to print, compare and duplicate files. In-house or purchased software may also be available for such functions as random sample or number generation and for retrieval and report generation.

Some retrieval/report generators such as Asi-st or Mark IV, while not designed specifically for auditors, have user-designed audit-oriented routines; sometimes the vendor may market such routines separately.

- Check with your external auditor. Most if not all of the "Big Eight" accounting firms have developed their own file-retrieval capability which may be available for your use.
- Evaluate your programming expertise. If you intend to take advantage of the DP resources already in-house, be prepared to demonstrate the competence of your staff in such areas as basic programming skills and JCL.

Such proficiency can be acquired by bringing a programmer into the audit department or by sending an auditor to in-house or outside DP classes.

If your DP audit staff is totally lacking in programming skills, it may be more cost-effective to purchase software geared specifically for the untutored DP auditor than to train him to use the software available in-house.

- Determine and prioritize the features you need. Evaluate your use of "standard" audit techniques such as sampling and confirmations. Determine what types of output you are likely to require.

Not every package can generate a file with binary fields; assess the different file structures and access methods used in your shop. Not every package includes a data base interface, but perhaps you don't need one.

- Determine which software packages satisfy those needs. Matrix logic can be used to structure the objectives which the intended software must satisfy. The matrix can be of the simple "yes/no" variety or could utilize weighted factors.

In either event, the matrix should also contain the constraints peculiar to your installation under which the software is expected to function – constraints of core, sort capacity, operating system, etc.

A matrix whose elements are composed of minimum operating requirements as well as desired features can aid the auditor in reaching a more objective and cost-effective decision.

- Evaluate vendor training, support and maintenance. Average training time provided by a vendor varies from three to five days. One software package, DYL-260, is self-taught.

Classes are usually limited, and extra materials or training is an additional expense. Once you have mastered the basics, however, you'll be inclined to pull the more sophisticated bells and whistles.

Review the documentation manual for clarity and logical organization. Find out whether ongoing technical support is provided in the purchase price of the software or requires an annual "maintenance" fee.

You might also investigate the probable continuity of the vend-

(Continued on Page S/30)

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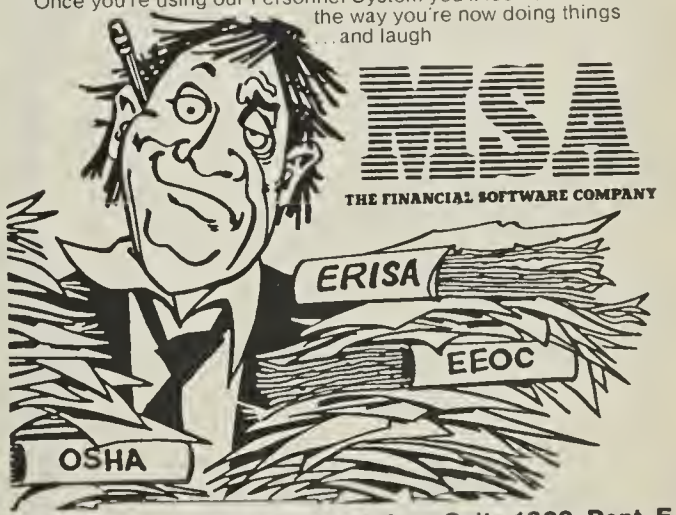

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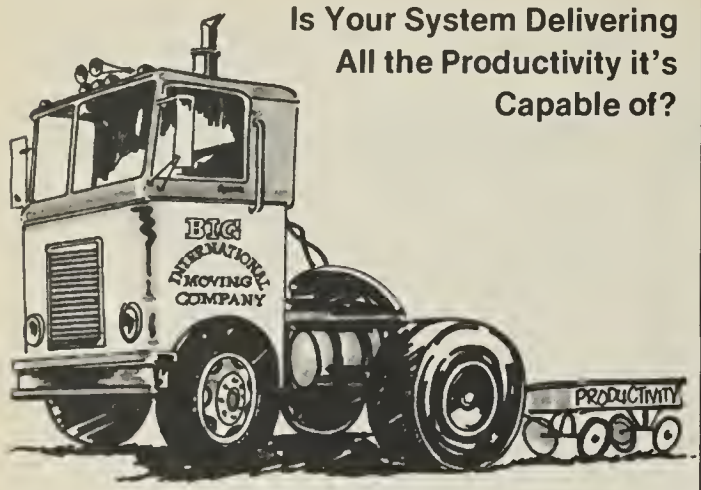

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Successful Product Has Many Varied Ingredients

By Martin A. Goetz
Special to Computerworld

At last count, today's software products numbered in the thousands. Annual sales for the independent software companies have reached the $500 million range, with annual growth predictions of about 25% through 1985.

There is no doubt that the catalyst for this rapid growth was the software unbundling back in 1970. Prior to that time, there was only a very small handful of successful software products; today, there are hundreds.

While unbundling did increase the opportunity for success, six years later there are still literally thousands of unsuccessful or marginally profitable software products being built both by hardware manufacturers and independent software suppliers.

'Currently, successful products are usually the most technically advanced. The day of buying "pig-in-a-poke" software is gone forever.'

On the average, the actual chance for success is still only about one in 10.

So, many questions continue to linger in many people's minds. What makes a successful software product? How do you go about selecting the right type of products?

Then, how do you go about developing and marketing it? To what degree does luck play a part in a product's initial success? And how can you ensure its continued success in the future?

Like any good recipe, there are many different ingredients involved – and most of them are invisible. If you're interested in getting a share of the software "pie," many ingredients are definitely necessary to produce a successful product.

Technical Factors

One is advanced technology. Build that better mousetrap. Today's users are knowledgeable enough to objectively compare competitive products.

Currently, successful products are usually the most technically advanced. The day of buying "pig-in-a-poke" software is gone forever.

Also, most successful software products have been built by companies with key personnel that have strong and concentrated experience in the specific problem areas addressed by each product. Buying expertise usually won't work. Either you have it or you don't.

Another factor is engineering disciplines. Most products are targeted for long lives – and must be continually enhanced to remain competitive and viable. A soundly designed and constructed product will go a long way to ensure success.

Very profitable products usually owe their success to a programming team that did more than simply implement the specifications.

More often than not, there was a team effort reflecting total involvement with the product, often resulting in continued product concern on a permanent and personal basis.

Also, programming management places much emphasis on a product's ease of use because of training problems, shortage of personnel and inexperienced users. Thus, "easy-to-use" should be one of the primary technical goals.

Marketing Factors

A strong, seasoned sales force is a must in today's selling environment. Without this, even the most promising product is almost doomed to failure.

The really successful products have an excellent history of being well supported after they are sold. Users want and expect good service – and they are prepared to pay for it.

A formula for determining an optimum price to maximize profits is difficult to derive. In general, the most successful products are priced under $50,000 and generally between $5,000 to $30,000. Most successful products have a cost savings ratio of at least 50 to 1, between building or buying.

Another ingredient is that the product must meet the need.

(Continued on Page S/32)

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Software Firms Must Manage Growth

By Mike Harvey
Special to Computerworld

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It's a fragmented industry and it is not too hard to understand why: There is a clear-cut need and demand for the product.

Software returns a relatively high yield, and it doesn't take a massive capital investment to become a garage-shop software house.

The big question is: Which of the 400 are going to survive the next 10 years? Even a casual observer would agree that a massive shakeout is coming.

Just as in every other aspect of our industry, software has attracted hundreds of small "entry companies" which will eventually dwindle down to 10 or 20 key firms.

Survival and prosperity in the industry requires critical mass resourcing, economies of scale and competent professional management of those resources. That's the only way to ensure consistent quality and standardization. And it is the only way to manage change.

Growth and the management of growth are probably the most critical factors in the success of any business.

Let's touch for a moment on growth in a company in a period of declining sales, raw-material price increases, tight money, high interest rates and the ever-increasing need for reliable and effective management control.

Even the largest companies are having to face the possibility of layoffs, hiring freezes and production cutbacks. Many have even stopped making long-term commitments to much of anything and are focusing attention to current operations and how to make them more effective.

Not too many years ago, a 16K IBM 1401 tape system was considered a big machine. A tremendous amount of work was being done on equipment that, by today's standards, were minicomputers.

Today, we're giving away tens of thousands of bytes to operating system software before we load in the first application. From 20% to 60% of the system's performance is being given back to the machine just to manage its own resources. That's overhead.

Conversions and upgrades? Generally speaking, an upgrade these days from DOS to OS or from OS to VS can be as complex and expensive as a total conversion to different hardware.

And the cost in converting memory and mainframe of about $10,000/mo all the way up to $50,000/mo in pure hardware costs alone. Not to mention software conversion and emulation costs.

Money wasters like these are targets and opportunities for the independent software supplier's packaged system. And credible, efficient alternatives to IBM's brute-force approach exist today.

Applications Nightmares

Conversion problems are real headaches, but consider the nightmares inherent in the applications themselves. They have become so complex and voluminous that a simple operator error can require massive and expensive recovery efforts.

Look at tape management today. Picture the hair pulling and teeth gnashing at a company using a 30,000-reel magnetic tape library when an operator clobbers an important master file by mounting it as a scratch tape. Painful to think about, but it happens.

A good tape management system prevents that. This too has been a fruitful target for independent suppliers. Viable alternatives to IBM products now exist.

Independent software packages can offer the using community some reliable, cost-effective relief to the problems of DP operation by:

- Lowering ongoing operating costs.
- Diminishing the programmer/analyst recruiting problem and making better use of the people the company now has.
- Giving users a faster response and putting results in their hands more quickly.
- Getting more work out of existing hardware and possibly deferring the need for upgrading.
- Making possible easier and less costly conversion if and when upgrading does become necessary.
- Giving, overall, a better software "blast for your buck" through spreading the product development costs over a large base of users. In other words, lower prices through simple economies of scale.

'If a user is thinking of developing his own software with his own in-house programmers and analysts, he should know the do-it-yourself approach can cost seven to 10 times more than the proprietary package purchase.'

There are those, of course, who say that all the problems and inefficiencies with today's software will go away when IBM hits the market with its Future System (FS) or "System Q" or

(Continued on Page S/35)

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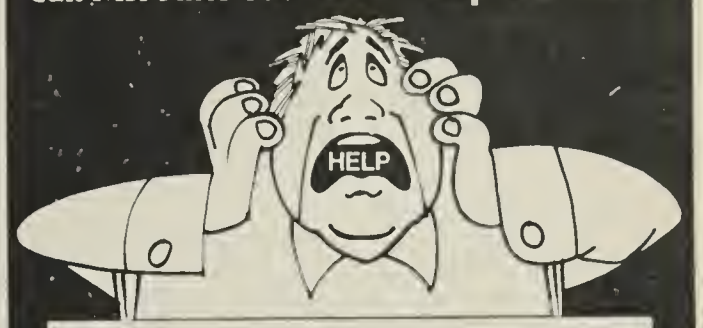

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DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

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DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is synchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

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DOCS provides a seperate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a Background partition problem program.

Package Manages Real Estate Firm's Lease Activity

Special to Computerworld

ATLANTA — Crow, Carter & Associates, a real estate development and management firm which specializes in large-scale commercial projects, feels it has found a way to get the most out of its leasing and managing operation.

A Tenant Accounting System (TAS) enables Crow, Carter to anticipate and act on the leasing activity of its 1,000 commercial tenants.

The result is improved and more timely information for follow-up by its leasing agents and, most importantly in these times, improved cash flow because of the timeliness and increased reliability of billing and receivable data furnished to property management personnel.

Written expecially for Crow, Carter jointly by technicians from National CSS, Inc. and Arthur Anderson & Co., TAS is linked to the real estate firm's data base, which is maintained and processed on the National CSS remote-computing network. The nature of its leasing activity requires the timeliness and cost-effectiveness time-sharing provides, Dennis Brown, Crow, Carter's controller, said.

An owner/developer of commercial and industrial properties in the Southeast, the company guides a large development through the range of real estate activities, from its inception to leasing space and managing the properties.

Crow, Carter begins with research to establish the feasibility of a project, builds and then guides a team of architects and builders through budgeting and construction.

It seeks out potential tenants and coordinates their needs with the facilities of its various properties. Among Crow, Carter's projects are three regional shopping centers in the Atlanta area, including stores such as Rich's, Davisons (Macy), J.C. Penney's and Sears.

'Faced with such a plethora of variables, the DP auditor can no longer afford "seat-of-the-pants" decision making.'

Other Crow, Carter developments include two major suburban office parks here, a midtown 40-story office building and a 380-room hotel project in Charlotte, N.C. Smaller scale developments include warehouses and office buildings scattered through Georgia, Alabama, Tennessee and Florida.

Crow, Carter generally owns all or some portion of the projects it has developed.

Ultimately, however, the success or failure of a real estate company is a function of the net revenues from leasing and managing space in completed projects. Crow, Carter handled the leasing activity (including receivables) of its then 750 tenants on a manual basis until August 1974 when the tenant accounting system was converted to computer.

"It had become obvious to us we couldn't manage so many tenants on a timely basis with a manual method, especially considering the increase in the number of tenants we anticipated," Brown said. "It was necessary to establish a system that could adequately keep up with the multiple and complex changes in leasing activity and report them to the necessary people."

Keeping Current on Changes

Keeping current on lease changes is critical to profits in real estate, Brown noted. Every lease is different. Anticipating these differences permits action as soon as the changes become effective. This reaction is an important factor in maximizing rental revenues.

TAS is utilized from the time a tenant signs a lease until the last dollar is collected from him. The source for computer information is a lease summary report, a highly detailed record of tenant information, lease stipulations, leasing agent designations, commission activity information and additional data necessary to generate bills, management and leasing reports. The information is entered into the data base maintained on National CSS's computer.

TAS contains all the basics of a sophisticated billing and receivables system and additionally has integrated with it a management reporting system tailored to the needs of commercial real estate management and leasing.

Included in the regular management reports are delinquency lists, analyses of billings and collections by building, a breakdown of collections by leasing agent, monthly occupancy data by building, expiration lists and lease change reports.

'Automatic Tickler System'

Lease change reports are automatically printed 90 days before the change is due to become effective. This reminder of a special lease stipulation is supplied to management and the leasing agent for follow-up.

The report acts as an "automatic tickler system," Brown said, alerting leasing agents to begin any necessary action that will expedite the change.

The benefits of knowing about changes in advance are significant to real estate operations. Leasing agents are reminded to follow up on options granted in the lease if that is the anticipated change.

If the change is a rate increase, collection of the higher rent will begin the moment it goes into effect. Similarly, the lease expiration lists detail expiring leases six months in advance to give agents time to explore a renewal or make other contacts to release the space as soon as it become vacant.

"It's not unusual in real estate companies without a computer system to discover a lease change six months after it become effective," Brown said. "No manual system could keep up with this activity in the same timely and reliable manner."

In addition to the ability to follow up on collections and arrange for optimal use of available space, time-sharing gives Crow, Carter other advantages.

This computer system enables each individual clerk to handle a much larger volume of tenants, a cost saving in personnel that keeps profits higher.

Lease changes are reported in such a way that management is informed not only of the change, but whether something has been done about it. The system thus establishes an automatic check on leasing agent and management performance.

In addition to its computer terminal here, Crow, Carter has a terminal in Charlotte which allows for on-site collections. This capability is one of the great features of time-sharing, it feels.

On-site management can handle much of the day-to-day accounting, yet the central accounting department retains control and access to all of the information in the system for that project on an immediate basis.

Software Plays Vital Role In DP Auditing Techniques

(Continued from Page S/27)

ing firm, particularly if the source code is not included. To protect yourself, it is wise to specify in the purchase agreement that, in the event of dissolution, the vendor will release the source code, whether at cost or otherwise.

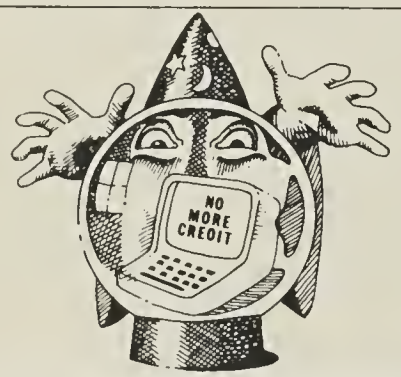
- Contact other users. Many of the retrieval/report generation packages have active user groups. Contact these groups before you purchase; they have first-hand experience regarding ease of installation, simplicity of use, promptness of vendor response, etc.
- Finally, check with legal counsel. Many DP departments have legal expertise within the department. These individuals negotiate all contracts for hardware, software and ancillary materials and may be more familiar with the legal vagaries peculiar to the DP industry than is corporate counsel.

But whether it be corporate counsel or a DP specialist, always seek the best legal advice available when negotiating your software contract.

Remember, the vendor's contract is partial to him — not you.

Marino is the assistant director of operations, DP auditing at the Hartford Life Insurance Co.

Accounts Receivable



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Must First Recognize Problems

Guidelines Can Help First-Time User Select Support

(Continued from Page S/15)

In fact, the proprietors' background should be of interest, he added, but more as an indication of whether they are businessmen who can keep the systems house going, or "computer freaks" who are intrigued with the potential of every system they build, but can't control the use of their resources.

The nonbusinessmen owners of systems houses are often reluctant to freeze the specifications of what they are trying to do for the first-time user.

They modify the system design as they get to know the user's business, but the modifications aren't the "normal" clarifications of points already covered by written specifications; they really are extensions of whatever has been agreed to already.

Such fluid situations are very much dependent on the user's perception of what he's getting and, if he remains generally ignorant of what he reasonably can expect out of a computer system, he won't know how to stop this iterative process, Oplinger said.

And the systems house itself may be little or no help in this regard.

Writing a contract is very difficult. Though lots of users think vendors are sneaky and trying to put something over on them – especially as costs rise beyond what the users originally expected – "the fact is, most systems houses don't have the smarts to write a good contract," and that obviously is a problem, he said.

If the system seems to be getting much more complex or just plain bigger than he expected, the user should call on someone for help – some independent third party who can educate him on what he can expect from a computerized system.

Hiring a consultant as well as a systems house may seem redundant, Oplinger said, but the extra cost may well provide the control leverage the user needs.

New Source of Help

Newly developing sources of outside help in understanding the potential of computerized systems are the trade associations in which many first-time users already are members.

These organizations clearly understand the business problems of their members, and they are getting the capability either in-house or through well-established contacts with outside people to help the membership evaluate computerized systems intelligently, Oplinger said.

One of the problems in bringing together a user and a systems house may be the user who knows too much about DP's potential, he added. This kind of user is liable to ask too much of his original system. He looks ahead to visualize what it should be able to do years from now, rather than taking adequate time to create a system to meet the immediate need that led him to DP in the first place.

'Newly developing sources of outside help in understanding the potential of computerized systems are the trade associations in which many first-time users already are members.'

Oplinger had no specific suggestions on how to help such an overcommitted user.

He did, however, recognize that there is another class of organizations who are making use of systems houses. These are the large outfits that have major DP staffs, but who need help in building a new capability to complement existing facilities.

They clearly are not naive, but even they have to be careful in dealing with the systems house. They may very well assume the potential vendor has their same perception of the job to be done, and their insistence on features the systems house can't deliver "could run most systems houses around the corner a few times."

1,200 Cobol Jobs Converted to OS/VS With Packages' Help

(Continued from Page S/23)

to be hand-coded and his crew could make the few changes without being concerned about all the code that had been successfully converted by the package.

Ninety-five percent of the Cobol coding was converted by the Arkay system, Waterhouse estimated, and he was even more positive about the JCL conversion support he got from the independent's package.

Arkay's JCL output is "100% accurate. I've run many jobstreams through that converter and never had to make any changes . . . It's unbelievable . . . Keane Associates [a contract programming/consulting firm based near here] has looked at it . . . so has IBM."

By contrast, Waterhouse described an earlier effort his crew undertook trying to work with a JCL converter provided by IBM. They tried for three weeks to make it work, but failed even after talking to the program's author.

Unfortunately, as it turned out, that converter was geared to working with JCL for DOS Release 26 and below – the releases that were strictly 360-oriented – and Allied was already up to Release 30, utilizing some of the unique 370 features. So it really wasn't that package's fault, Waterhouse said.

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Some Elements Invisible

Successful Software Has Many Ingredients

(Continued from Page S/28)

There are many basic problems software products can solve. The more obvious the need, the better the chance for success. Today's successful products all meet very basic needs.

Also, if you can easily demonstrate the benefits of a product's use, this will significantly contribute to its positive reception. If you can't, you might consider developing a procedure for simulating its practical applications. Nothing can be more effective than a "live" and concrete demonstration.

The successful product usually rates very high concerning the quantity and quality of its supporting documentation. Documentation spans the spectrum from strictly sales literature to detailed installation/operation manuals.

A good deal of money, personnel and computer power is always needed. Most products will require several years before becoming profitable (usually a two- to three-year wait from the start of development).

An intuitive insight and complete commitment on the par of management is usually necessary to direct the overall development and marketing of the product. This backing will provide the vital support needed to survive those inevitable rough periods.

'Provided you have a good product developed from a sound concept, always encourage and enjoy any competition which may develop.'

Most successful programs cannot be built in a vacuum. Using selected users as a sounding board for new developments will help ensure the continued success of any product.

Provided you have a good product developed from a sound concept, always encourage and enjoy any competition which may develop.

Rather than resenting or resisting this competitive environment, remember that it stimulates the market and makes users receptive to buying. Most of today's successful products are actively competing with either unbundled or bundled software.

Finally, the successful software product always acknowledges luck as a factor in its success. But, for the most part, dedication, patience and foresight make a greater contribution than does luck.

While the factors associated with the success of a software product may appear somewhat axiomatic, never underestimate the effort needed to assure this success. Like most endeavors — nothing good ever comes easy.

Combining and balancing the various ingredients discussed above is no simple job. In many respects, these ingredients are part of a chain — and even the smallest weak link can make the difference between success and failure.

Future Consequences

The last several years have dramatically demonstrated the benefits of successful software products — both in the systems and applications areas.

Successful system software has significantly improved the productivity and disciplines of program development, while simultaneously reducing the cost to get applications operational.

Applications software has reduced the total number of applications which companies must develop from scratch.

The cost benefits are obvious — but, besides saving money, software products can be installed without the proverbial operational headaches and frustrations. Software products are guaranteed to work, and the

In the future, these benefits will continue to accrue to the users of software packages — and off-the-shelf software will become as commonplace as a DP purchase as off-the-shelf hardware.

To assure this future, both software product vendors and users must hope and strive for a continued healthy — that is, competitive - environment. The future for good software products is rosy, for they can deliver dramatic benefits to their users.

But, the DP community will be able to enjoy these products and their benefits in the years ahead only if they collectively nurture and appreciate a truly competitive environment. The net result will be not only success for individual software products, but a successful future for computer users.

Goetz is senior vice-president of ADR, holder of the U.S. patent on the "Autoflow" flowcharting software, and past president of the Software Industry Association section of the Association of Data Processing Service Organizations.

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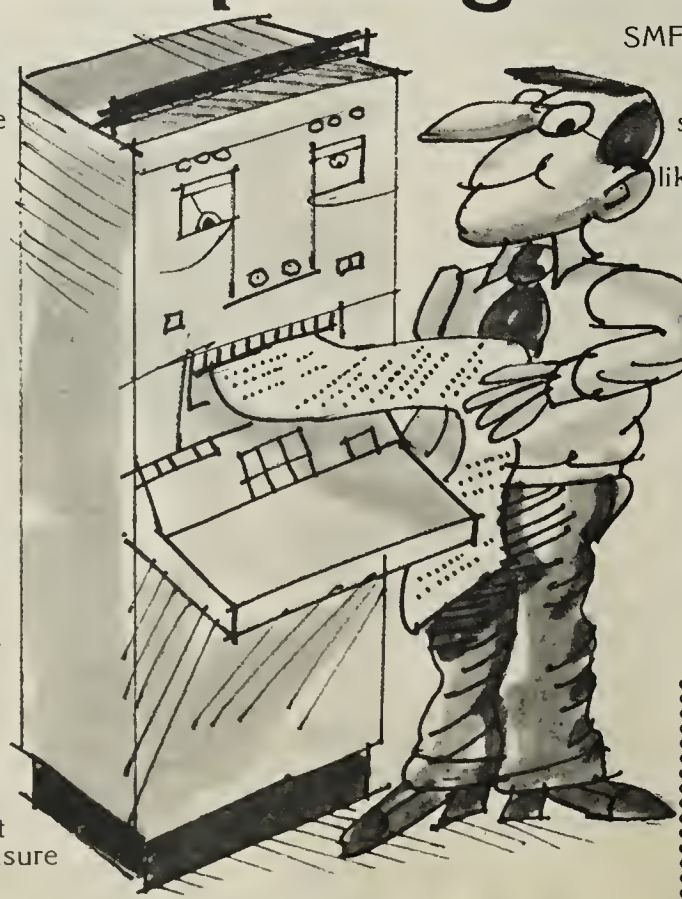

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References Guide User Seeking Package From Outside Sources

By Don Leavitt
Of the CW Staff

One of the most serious problems faced by user installations considering the acquisition of software from outside sources is knowing where to start looking.

Direct-mail campaigns obviously bring some products and some vendors to mind. Advertisements and product announcements in trade publications may add to the user's pool of knowledge.

Hearsay and presentations at professional meetings can also be beneficial, especially when they provide user evaluations – implied or explicit – of the products under discussion.

But those are all rather casual approaches to gaining a complete idea of what is available. To fill the gap, there are, happily, a range of well-established references, listing a variety of packages and sources and compiled by organizations that have no particular proprietary interest in the software products themselves.

Reference Sources

In alphabetic sequence with no intention of ranking intended – and recognizing that the tally may well be incomplete – these reference sources include:

• *Auerbach Class Reports.* In addition to its monumental loose-leaf descriptions of hardware systems, Auerbach also publishes detailed write-ups on individual software packages and "Class Reports" in which the capabilities of packages are discussed.

Another report from this firm summarizes the facilities available through time-sharing or remote-computing networks. Auerbach Publishers, Inc. is at 6560 N. Park Drive, Pennsauken, N.J. 08109.

• *Computer Program Abstracts.* Published by the U.S Government Printing Office and updated quarterly, this guide lists software products developed by federal agencies and their contractors and now available at modest cost through the Computer Software Management Information Center (Cosmic).

Many of the packages cover exotic applications for space projects and the like, but a number of them are useful in the business DP environment. Cosmic is at 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

• *Datapro Reports.* Along with its dual (management and technical levels) descriptions of hardware systems, "Datapro '70" includes detailed write-ups of major software products and reports of user evaluations. "All About Remote Computing Networks" is another report covering that source of software.

Datapro has also recently introduced a *Software Directory*, made up of abstracts – written by Datapro – intended to show the range of packages available, rather than extended material on each. Datapro Research Corp. is at 1805 Underwood Blvd, Delran, N.J. 08075.

• *EDP Analyzer.* A monthly publication edited by Richard Canning (a major figure in the Association for Computing Processing), the *Analyzer* focuses on specific software issues, devoting the entire 12 to 14 pages to the logical basic of the subject and the highlights of various software products related to it. Canning Publications, Inc. is at 925 Anza Ave., Vista, Calif. 92083.

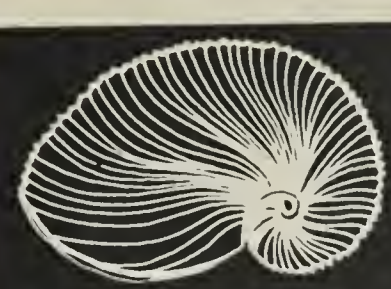
• *EDP Performance Review.* Another monthly publication, this one has no interest in application software per se but dwells on packages and techniques related to improving the performance of the DP center itself.

Once a year, an issue is formatted as a catalog of packages, by specific subject within the general class of performance-related software. Applied Computer Research, the publisher, is at Suite 298, 8808 N. Central Ave., Phoenix, Ariz. 85020.

• *ICP Software Directory.* Published by International Computer Programs, Inc, this soft-cover two-volume set, once known as the *ICP Quarterly*, is now updated semiannually. It contains vendor-written abstracts of many, many products organized by subject, including a basic division between systems and utility packages in one volume and application-oriented offerings in the second.

A major index by package title is supplemented by a cross-reference list by hardware so the non-IBM installation, for example, can find help without wading through packages that are unsuitable. The publisher is at 1119 Keystone Way, Carmel, Ind. 46032.

(Continued on Page S/34)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Becoming Preferred Software Source

Management Recognizing Advantages of Independents

By Lloyd Baldwin
Special to Computerworld

Contrary to some opinions, software and the software industry will continue to be an integral and indispensible part of the data processing world.

Regardless of how much hardware or software new technologies will put into firmware, computers will still have to be programmed, and software people are the ones to do it.

Furthermore, the independent professional software supplier – the software industry – is rapidly becoming the preferred source of software. Top corporate management and DP department heads are coming to recognize the major advantages of outside professional software sources.

One of these advantages is quicker turnaround time. Outside application package suppliers and custom program organizations have the necessary pool of skills and equipment to respond to customer needs in a reasonable time, offering guaranteed performance.

Also, an application package that has earned its development cost many times over is bound to be of proven value.

Software service companies deal with and solve systems problems every day. By virtue of their specialization they have skills and products normally unavailable in-house at similar costs or within a similar time frame.

Because software is a highly labor-intensive product, it requires specialized skills found in software houses. For many reasons, economic as well as self-motivational, the best skilled people tend to concentrate within independent software organizations.

Another advantage is that documentation and training are built-in segments of the independent software supplier's package and service. Complete manuals and guaranteed performance are standard parts of the professional software producer's product or service.

More than 75% of users who purchased independently produced software four years ago are still using that product. This is because when maintenance is entrusted to the professional supplier two things happen: it gets done, and in-house computer time and personnel are freed up for other DP work.

New patterns in technology and computer usage dictate the future course of the software industry's development. That course, in the opinion of industry leaders, is in the direction of higher level languages, distributive processing and a growing independence of the user from the tyranny of the linear or sequential thinking imposed by the nature of the hardware.

Robert Lifset of ACS Computers, Inc. in Union, N.J., has suggested several aspects of future software technology. One is that languages will become more closely oriented to the user's need and area of activity.

Tymshare's BBL, for instance, contains powerful verbs that simplify financial analysis computations such as net present values or returns on investment.

Another example is IBM's General Information System (GIS) package, which enables a user to program some of his own reports using a preexisting data file or data base.

Also, Data base management systems (DBMS) make possible the addition of new data, rearrangement of existing data file structures and access methods, all without a need to change application programs.

DBMS easily accommodates the constantly changing information needs of management and opens the way for more realistic approaches to producing information rather than merely processing data.

Another aspect Lifset touched on was that, with the rising cost and shortage of skilled help, the independent source of specialized application programs is becoming increasingly attractive.

With over 3,000 different software products on the market today, the chances of finding exactly what a user needs, requiring only minor, if any, modifications are excellent.

As computers become increasingly ac-

(Continued on Page S/36)

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8. **SPLICE**, the Shorthand Programming Language in a COBOL environment. SPLICE is a COBOL precompiler which will reduce the initial coding of all COBOL programs by at least 50%
9. **DOSLIB**, DOS Tape Library System is a basic offline tape library system, with extended online capabilities and special features
10. **LIBRA**, Partition Priority Balancer, which reassigns I/O bound jobs over CPU bound jobs, typically increasing thruput of DOS/VS installations 15-30% Additional features include display of VS paging rates and notification when IBM's paging monitor deactivates a partition

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18. **DBMI LIST** a Generalized Data Base List Program, used to print DL1 data bases.
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C

References Help User Pick Outside Package

(Continued from Page S/33)

• *Minicomputer Software Directory* (MSD). A loose-leaf publication started last spring and updated periodically, MSD is organized primarily by vendor, outlining the location, organization, size and area of expertise claimed by each before listing the software offered by the company.

The level of software service (package, consulting/design, custom/contract programming or turnkey system) is shown for each software item listed. Cross-reference indexes are organized by application area and by hardware. Minicomputer Data Services, the publisher, is at 20 Coventry Lane, Riverside, Conn. 06878.

• *Packaged Software Report.* Still another monthly publication, this one also dwells on one basic subject in each issue, then includes a write-up of a specific package as an example of the issue's theme. Management Information Corp., the publisher, is at 140 Barclay Center, Cherry Hill, N.J. 08034.

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Software Industry Must Manage Growth

(Continued from Page S/4)
whatever it will be called tomorrow, and then today's independent software market will dry up.

They expect FS to have that big an impact on the software industry.

Certainly, IBM's FS will have an impact. But I believe it will be evolutionary in nature, not revolutionary.

Users simply can't afford the kind of revolution they dived into with the IBM 360; we're all still back-pedaling to recover from that one.

'Today, we're giving away tens of thousands of bytes to operating system software before we load in the first application. From 20% to 60% of the system's performance is being given to the machine just to manage its own resources. That's overhead.'

And, after all, IBM can't afford to allow its installed base to become obsolete, especially since a lot of companies today are even looking seriously into the wisdom of moving backwards to earlier 360 versions and cashing in on the lower hardware prices and more stable software.

FS is coming – time and progress march on. But it'll probably take the DP industry three to five years to digest the coming generation. In that time, we'll be able to manage the implications of the transition.

So, for the time being, a user is still faced with a software problem. And, according to studies I've seen, he is now thinking seriously about independent software packages as a viable alternative to hardware producers' "free software" and to in-house development of the software needed.

Unbundling Beneficial

Obviously, unbundling by IBM and other hardware manufacturers has been of great benefit to the independent software industry.

Users are now paying for most of their software, whether it comes from the hardware producer or the independent vendor, so they're scrutinizing everybody's software closely.

Take a good hard look at independent proprietary packages before implementing those "free" packages from the hardware manufacturer.

The overall costs of installing and operating that "free" package may be considerably more than a well-designed, independently purchased package.

If a user is thinking of developing his own software with his own in-house programmers and analysts, he should know the do-it-yourself approach can cost seven to 10 times more than the proprietary package purchase.

Furthermore, in-house development and installation time can run into years while purchased software tends to be up and running within one to three months. Purchased software can also make more efficient use of hardware.

In the next 10 years, the application software industry is going to be 1,430% bigger than it is now. Overall, the systems and applications software business will expand by 737% in the same time period. Some $19 billion is going to be spent on software between now and 1986.

Consider something else: the impact of new technology seemingly makes hardware obsolete even before it enters the marketplace.

For instance, just within the past few months, General Instruments announced it has put a complete 16-bit processor on a single chip. I suspect that blew some gaping holes in a few companies' product development plans.

And just a couple of months back, another small company began lashing Intel 8080 chips together. It said the hardware performance equals that of the IBM 360/65 – and for a $70,000 price tag.

By lashing still more chips to the chain, it promised to deliver

(Continued from Page S/29)

Software Evaluation Checklist

- Make sure you have made a definitive evaluation of your software needs and requirements.
- Gather information about every available software package that looks like it may meet your requirements.
- Narrow your vendor field to those suppliers offering well-proven packages that fit your system.
- Evaluate the vendor companies themselves as to their abilities to offer you good organization and support.
- Evaluate the documentation supplied with each package. Is it adequate? After all, you want vendor support, but not vendor domination.
- If the application is time-dependent, conduct benchmark tests of the products you're seriously considering.
- Talk to users of the packages you're considering, and question them in depth. Find out what they paid for the product, what the strong points are and where they've had problems. Dig for the details.
- When you get all the right answers and even some negative comments from users, and you are satisfied that a package meets your needs in every respect, you're ready to buy.

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The Statistical Package for the Social Sciences is an integrated system of computer programs for the statistical analysis of data. It is a comprehensive set of statistical functions which enables a researcher with no programming experience to perform a wide variety of data analyses in a simple and convenient manner on most large computer systems, including IBM (OS, DOS), UNIVAC (70,1100), CDC (3000,6000), HONEYWELL, BURROUGHS, XEROX, ICL, DEC, FACOM, SIEMENS, and TELEFUNKEN. Two manuals are available from McGraw-Hill which describe the system: SPSS, a 675-page manual which discusses the statistical routines and their use; and the SPSS PRIMER, a 134-page introduction to computer technology and some major features of the SPSS system.

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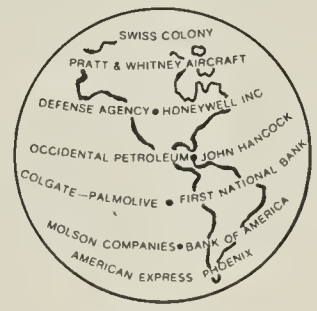

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Many Advantages Seen

Independents Becoming Preferred Software Source

(Continued from Page S/34)

cessible to members of top management who are relatively untrained in computer technology, Lifset said, the need is for software packages able to accommodate the nonlinear thought processes of the untrained user.

Even now, our industry is developing software to cope with instructions given in sequence dictated by the user's thought processes rather than by the way a computer works.

Computer Usage

Tom Richley of Cincom Systems, Inc. in Cincinnati, has long been disturbed by man's tendency to make simple things complex. He believes – with a vengeance – this applies to data processing.

Data processing within corporations was born in the late 1950s, when it was discovered that payroll checks could be printed electromechanically, he noted.

When companies installed in-house computers, new applications were sought feverishly to further justify the expensive equipment. They were found and, in the process of converting metal filing cabinets to magnetic tape and later to disks, endless varieties of reports – many of them redundant – were produced.

These, in turn, led to a need for more equipment so that more reports could be created – all without such regard to the usefulness and the benefits of the data being produced.

Had we spent the better part of the last two decades analyzing the nature of management's needs for information and developing the technology and equipment to answer these needs – instead of looking for more things to automate – the DP industry would have had a totally different pattern of progress, Richley believes.

We would have seen the development of directly accessible mass-storage and on-line terminals before the development of magnetic tape files, card readers and printers.

We would have seen the development of transaction-oriented modular programming long before the development of batch-processing techniques.

We would have seen the development of on-line query languages before report writers.

In short, we would have realized the benefits of building an electronic warehouse of data, which would have been far more useful than the replacement of clerks – the early justification for using DP.

With the advent of highly sophisticated and powerful minicomputers, coupled with the development of data base systems completely separate from applications, plus high-level languages, we are now seeing the start of true distributive processing in which the data base itself is distributed.

It would make a lot of sense for a manufacturing company, for instance, with several geographically separated plants or an insurance company with regional offices to equip each plant or regional office with computer systems of its own – with all customer files, operating and reporting data and data base pertinent to the plant area or region – resident in the local computer system.

Local Access

Local offices within the plant's or region's operating area could access the computer through CRT or other terminal equipment via teleprocessing lines.

It is further conceivable to install small systems in each local sales office which hold all customer data served by that office, Richley said. When the local sales office processes a customer's order, for instance, it would access the customer file locally and the inventory file at the plant warehouse.

With the available software technology and the low price of powerful small computer systems, such truly distributive processing systems are entirely plausible. The corporate processing center can still access data from the remote, distributed data bases, and the remote centers can logically interact with portions of the corporate data base.

We got lost 20 years ago when we started to search for ways to use the computer rather than for the kinds of technologies needed to meet the information needs of management.

The efficiency of and the need for the distributive processing concept is becoming more apparent each day. The software industry even now is developing the operating systems and applications that make this concept – almost classic in its simplicity – applicable to an ever-broadening market.

Baldwin is president of the Software Industry Association section of the Association of Data Processing Service Organizations (Adapso).

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Software Industry Must Manage Growth

(Continued from Page S/35)

IBM 370/195 performance for a mere $400,000. For about $1 million, the firm said it has number-crunching performance bigger and faster than anything that has yet been built.

We can only speculate on the future impact of the IBM 5100. It may be another nucleus product in the consumer market.

The implications of all this? Simple. We are rapidly moving to a position where hardware is going to become a commodity item.

Product differentiation is fast becoming the sole domain of competent and responsive software.

Look at the government market as an indicator of the shift of investment away from hardware and toward software. In the late 1950s, software costs in the Defense Department were about 15% of the total computer system cost.

Today, they account for about 70%. By 1985, the Pentagon projects software costs will be 90% of the total DP budget.

Trends in Software Structure Seen Affecting System Functions

With the author's permission, this is an abstract of a presentation Severino made at Datacomm '76 last week in New Orleans.

By Elizabeth F. Severino

There are several recognizable trends in hardware and software that are going to affect the average DP shop.

Among the trends are:

- Use of higher level languages, including higher level job control languages.
- Removal of the applications programmer from physical resource considerations (data base).
- Virtual memory operating systems.
- Data communications/networking.
- Distributed processing.

In particular, data base, data communications and distributed processing are directly related to major technological trends in computer systems architecture.

There are two basic types of software architecture. In a centralized software architecture, all operating—system subsystems reside wholly in the single central processor and its immediate auxiliary devices.

A centralized afterthought operating system results from software designed for one processing environment, for example, batch processing, and constrained to handle other environments, such as time sharing added to a batch scheduler.

In equally distributed software, the subsystems reside equally in distributed central processors linked logically, each fed by its own peripheral subsystems.

In systematically distributed software, specific functions have been removed from a central processor and distributed in an organized, uniform manner.

In randomly distributed software, specific functions from the subsystems are moved from and/or duplicated as required by isolated operating environment requirements.

Randomly distributed operating systems are often a phase in the maturing process of an operating system from centralized afterthought to systematically distributed architecture.

Most manufacturers today are using centralized operating system architectures. However, several are also moving toward systematically distributed software architecture.

Producing systematically distributed software involves the identification of the data communications/data base requirements on a computer system's central processor, and the successive, staged removal of these tasks from the CPU's ultimate control to areas of distributed hardware/software intelligence.

Channel-to-CPU Architecture

The first hardware approach we'll discuss is the channel-to-central-processor type of architecture, which is poorly suited for attempts at distributed processing environments, for virtual memory, for data base and for data communications activities.

Three of the systems we'll discuss use this hardware primarily: NCR Corp.'s Century systems, Univac's Series 90 and IBM's System/370. There are a few exceptions we'll discuss.

Software architecture for a channel-to-CPU hardware architecture should be integrated and centralized to be in harmony with the hardware architecture. Of the three, only Univac's VS/9 can claim this.

(Continued on Page S/38)

A guide through the Hardware Jungle

How to hunt big gains and avoid white elephants - in our March 29th report on "Stretching Your Hardware Dollar."

If you're shopping around for a way to increase your system capacity without moving up to a much bigger and much more expensive mainframe, then you've probably found that there's no "bargain basement" in DP. Instead, there's a hardware "jungle" of vendors, lessors, systems and peripherals. Most of them are, ostensibly, designed to deliver the added computer power you need for a fraction of the cost. But will they leave you out of the industry mainstream later on? Can enhancements really pay their own way? We'll be taking an in-depth look at questions like these in "Stretching Your Hardware Dollar," appearing in the March 29th issue of *Computerworld*.

Edited by Patrick Ward, this supplement will be filled with application stories and "how-to" tutorials on the ways you can save money choosing and acquiring hardware. We'll look at used machines, minis for offloading applications, and enhancing your systems with independent vendors' memory and peripherals. We'll show you ways to decide how many peripherals you need, and how to determine whether proposed enhancements will pay their own way. The supplement will report on what computers are moving in the used equipment market, and give you advice in looking for leasing opportunities.

If you're in the market for added computer power, you should be reading this supplement in the March 29th issue of *Computerworld*. And if you're marketing dollar-stretching hardware options, you should advertise them here. Don't miss the March 12th ad closing date. Your *Computerworld* salesman has all the details. Or, call Judy Milford at (617) 965-5800.

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Software Structure Seen Vital to System Functions

(Continued from Page S/37)

NCR comes very close; IBM misses.

Univac's Series 90 operates under VS/9, a recently rewritten operating system based on RCA's older Vmos operating system. VS/9 is characterized by system resource allocation capabilities that rival those of IBM's OS/VS2 Release 2 and features integrated data communication/data base capabilities.

The communications controller has many of the capabilities necessary to relieve the central processor, classically overworked in a channel-to-CPU arrangement.

The most noticeable limitation on the Series 90 is the lack of a front-end communications processor. However, the Series 90 is in a solid position.

Data communications is an integral part of NCR's Century Systems. Data base activities, although an afterthought, are provided via Cincom Systems, Inc.'s Total, a very fine data base management package.

The overall effect on the NCR system often is that of an integrated centralized software rather than an afterthought centralized software.

NCR's future offerings will probably be as solid as its present offerings. Rather than immediately moving to a channel-to-CPU or channel-to-system memory controller architecture, NCR will probably take the microprocessor approach to effect an interim, randomly distributed software architecture.

IBM System 360 and System 370 mostly use the classic, channel-to-CPU architecture.

DOS/VS and OS/VS1 and -2 are centralized, afterthought operating systems. Applications support for DOS/VS users has matured, of course.

But to use OS/VS with appropriate communications modules, extremely large amounts of resources are necessary for even a basic arrangement. This is partly because communications capability was merely an add-on to the original batch orientation of IBM's operating systems.

IBM's current communications support is better than its press, however. True, IBM has never been in the vanguard of communications technology; yet all of its models and operating systems offer support for transaction processing and remote batch.

As for IBM's future, in the immediate time frame it will probably prepare more integrated operating systems for the 370s. In fact, these centralized, integrated operating systems, with probably random distribution, will be used until the future systems are announced.

Channel to Main Memory

The second hardware approach uses the channel-to-main-memory architecture, an excellent performer in data communication/data base environments as long as it has a strong operating system.

Manufacturers implementing this hardware architecture include Digital Equipment Corp. in the Decsystem-10 and Decsystem-20 and Univac in its 1100 series.

DEC's Tops-10 is biased for performance in a time-sharing, interactive environment and treats batch more in an afterthought manner; it offers a little data base capability.

DEC has already moved to correct this situation. The operating system for the Decsystem-20 and Tops-20 is a merger of Tops-10 and Tenex, the operating system for DEC machines in the Arpa network. Tops-20 is a rewrite and, from all indications, represents a centralized, integrated, multimode operating system.

The Univac 1100 series also uses this architecture and supports a mixed environment of batch, interactive, and time-sharing applications.

The 1100 series is an interesting mixture of strengths and weaknesses. Its strengths are a distributed architecture (a mixture of channel-to-main memory and also channel-to-system/memory controller); an excellent operating system; a powerful front-end processor; and software packages for transaction processing, time-sharing, and remote batch.

Univac's primary weakness is that it has not announced any definitive data communications plan competitive with those of other major manufacturers.

Channel to System/Memory Controller

The third hardware approach is the channel-to-system/memory controller architecture, also extremely well suited to data communications/data base activities most likely the architecture for future systems.

Systems using this architecture include the Burroughs Corp. 700 medium systems and also the new 800 Systems; Control Data Corp.'s Cyber 170; and Honeywell Information Systems Series 60 Level 66.

This architecture, by the way, is also used by IBM in its 370/115, 125 and 168 models, but the architecture is defeated by centralized afterthought operating systems.

Every one of the manufacturers using this architecture already has either a centralized integrated software architecture or is moving toward the first stages of a systematically distributed software architecture.

Honeywell's Series 60 Level 66 also uses the channel-to-system/memory controller architecture. Almost the entire burden associated with communications is carried by the front-end processor, which attaches to the input/output multiplexer.

No Inherent Weaknesses

Honeywell has eliminated a potential bottleneck by allowing the system controller to interface two pairs of memory units and allowing overlapped access to either pair of memory units. As a matter of fact, there simply aren't any inherent weaknesses in HIS' Level 66 communications offerings.

Burroughs too offers channel-to-system/memory controller architecture. The operating system for the 2700, 3700 and 4700 was basically integrated, but did not include capabilities for data base.

The operating system for the large systems (6700/7700) is integrated and does include data base. It also includes an intelligent, programmable front-end communications controller.

Burroughs' systems are particularly suited to the movement toward distributed processing. In comparison with, say, IBM, Burroughs offers better transaction processing and remote batch capabilities.

Severino is a project editor of general-purpose computers at Auerbach Publishers, Inc.

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ASI/INQUIRY is an IMS DB/DC query language that operates completely as an interactive Message Processing Program. The design of ASI/INQUIRY is such that the *structure of the data base is transparent to the user*. Moreover, one need not have familiarity with DL/1 segment logic or the complexities of multi-pathing. Extremely rapid response time is assured.

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ASI/INQUIRY has been fully operational for over six months, and is currently installed in multiple sites here and in Europe.

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Bits & Pieces

Gould Has Printer/Plotter

CLEVELAND – The Gould, Inc. 5105 is a wide-based electrostatic printer/plotter that is said to produce exceptionally clean, high-density images from computer-generated graphics and alphanumerics, according to the firm.

According to the manufacturer, the Gould 5105 is especially suited for high-speed plotting of computer graphics in scientific and engineering applications such as seismic data recording, mapping, computer-aided design and architectural and engineering drawings.

The unit can plot standard D-size (22-in. by 34-in.) drawings complete in approximately 11 seconds – about 400 times faster than drum or pen plotters, the vendor said.

It plots graphics at up to 3 in./sec and prints 264 alphanumeric char./line at a speed of 1,200 line/min with an Ascii upper/lower case character set, the firm said.

Direct memory access interfaces are available for the IBM 360 or 370; the Digital Equipment Corp. PDP-11; the Data General Corp. Nova and Hewlett-Packard computers, the vendor said. The printer/plotter costs $14,385 from the firm at 3631 Perkins Ave., Cleveland, Ohio 44114.

DWI Adds RS-232 Interface

CHATSWORTH, Calif. – The Model 6600A RS-232 interface from Data Works Instrumentation (DWI) provides a means of adding an RS-232 communications interface to existing paper tape equipment, the company said.

It is described as a compatible controller for paper tape readers, magnetic tapes and floppy disks, the firm said.

The interface costs $595 from the firm at 9748 Cozycroft Ave., Chatsworth, Calif. 91311.

CBS Releases Ribbon Reinker

SANTA CLARA, Calif. – The CBS Marketing Co. Model 1432 computer printer ribbon recovery system can reink IBM 1403 or 3211 ribbons in three minutes or less, according to the firm.

The reinker can handle Control Data Corp., NCR, Honeywell and Data Products printers through adapters, the company said.

The Model 1432 cleans paper chaff and old ink from both sides of the ribbon and scans for holes, rips and tears, stopping when it detects such defects, the vendor said.

The Model 1432 costs between $5,500 and $6,500 from the firm at Suite 100, 2851 Park Ave., Santa Clara, Calif. 95050.

Replaces Two IBM Systems

Texas A&M Switches to Amdahl 470V/6

By Patrick Ward
Of the CW Staff

COLLEGE STATION, Texas – Texas A&M University chose an Amdahl 470V/6 over an IBM 370/168 because "for a few hundred thousand dollars less, we got a computer that gave us more throughput and growth capacity and didn't require software conversion," according to Dr. Dick Simmons, director of A&M's DP center.

"We had a few million dollars worth of [IBM-compatible] software all paid for and we just couldn't afford a conversion," he said.

"I was willing to let anyone bid, as long as they included the cost of a turnkey software conversion in their price," Simmons said.

No mainframe vendor other than IBM planned to bid because of the software conversion costs, until Amdahl made an offer last summer, Simmons said.

The university had originally planned to install a 370/168 in December of 1974, but "red tape" at the State Board of Control held up the installation, perhaps because there was only one bidder for the contract, Simmons said.

The university was using a 2.5M-byte IBM 360/65 to handle research and academic work and a 370/145 to run an extensive teleprocessing net, Dan Galvin, assistant director for operations, said.

Both systems were running short on capacity by the spring, Galvin said.

In June, Simmons decided to take a look at the first Amdahl 470V/6 installation at Columbia University.

"I am familiar with what first installations look like – disaster," Simmons said. However, "I was utterly amazed at the state of that system on first delivery," he said.

"On the second day of the cutover, a lot of Amdahl people were sitting around waiting for something to go wrong, but nothing went wrong," he said.

Amdahl offered a 60-day acceptance period at the time. "If it didn't work, it would take it back," Simmons said.

"I decided the Amdahl system would have to handle everything I had, including my complete network, during that 60-day trial period," he said.

Amdahl bid and won, and A&M was cleared by the state board for installation.

"We brought it in in the latter part of October," Simmons said. "Nine hours from the time the truck rolled in, we had it powered up," he said. "That was a Friday," he said.

That Monday, the 145 came down with a power supply problem "and we IPL'ed the 145 system onto the Amdahl," Galvin said.

During this time period, the Amdahl's scheduled uptime was about 97%, he said.

Simmons now estimates the 470's throughput is about 10 times that of the 360/65. Job turnaround has already improved, he said.

A&M has sold the 65 to the state controller and returned the 145 to IBM, Simmons said.

The computer center runs just about every kind of software on the 470, including IBM's IMS for data base/data communications, MRI Systems Corp. System 2000 data base management system, "essentially all language compilers" and a wide range of statistical packages.

A&M's peripherals include 24 spindles of Control Data Corp. 3330-1 equivalents, nine 3420 tape drives and a Comten, Inc. communications front end.

Jacquard Aims Key-to-Diskette At Clustered Data Entry User

SANTA MONICA, Calif. – Jacquard Systems has brought out a multistation key-to-diskette data entry and communications system designed for clustered data entry sites and distributed networks.

Called the J100, the stand-alone system allows multiple operators to enter, edit, verify and store data on diskettes or larger disks under software control, the vendor said.

Data can then be transferred to another diskette, printed on the system or transmitted in asynchronous or bisynchronous communications discipline.

The J100's master station is a 16-bit CPU with up to 128K bytes of memory, direct memory addressing, a 1,920-character CRT and two diskettes.

Options include satellite CRTs, 30 char./sec to 300 line/min printer controllers, tape and disk controllers and varied communications controllers.

The J100 provides fixed entry validation, accumulators, arithmetic and logic functions and I/O formatting, the vendor said.

Data output can be directed to the communications facility or, using the system data management (background) capability, to a line printer, auxiliary disk or display units.

Operational features include multi user support; time-sharing with diskette- or disk-based hardware; time slicing for multitasks; sequential, random-access and hashed index file access methods and extensive peripherals support, Jacquard said.

Software features include reentrant code; choice of Assembly or "Data Base Basic" languages; batch and interactive modes; file management; and extended labeling capability.

A minimum J100 system costs $13,900 from the firm at 2502 Broadway, Santa Monica, Calif. 90404.

Input 80 OCR Reader Systems At Bottom of REI's Cost Range

DALLAS – The Input 80 optical character recognition (OCR) readers from Recognition Equipment, Inc. (REI) are the lowest priced OCR systems in the company's line, a spokesman said.

The Input 80 models C-1 and D are stand-alone systems that capture data from documents, convert it into the language of the user's DP system and record it on magnetic tape.

Both models read "real-world" characters in single-font, multiple-font or multi-font applications, REI said. Each model can recognize "virtually all" OCR-readable fonts, read intermixed fonts in a variety of character spacing on the same line and read handprinted numbers, a spokesman added.

In addition, they can read documents with carbon image characters, smudges, tears, skewed characters and, in general, documents where the quality is degraded, the company said.

Each model is available with REI's Total Data Entry feature, a key-to-disk option that provides an input system with up to 22 CRT stations for both OCR video reentry and key-oriented applications.

Production versions of the Input 80 models C-1 and D will be available late this year. Prices will begin at approximately $200,000.

Each model will be available for purchase or lease from the firm at P.O. Box 22307, Dallas, Texas 75222.

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Belgian Center Has Trouble Keeping Up With Growth

By I. Berenyi
Special to Computerworld

BRUSSELS, Belgium – The Petrofina computer center here is one of the largest in Belgium; its growth rate has been so fast that any new DP gear it buys seems to become saturated almost as soon as it goes live.

The main computer center is in an almost constant state of transition, and it's no wonder Jean Dewez, Petrofina's DP chief, seems a permanently harassed man.

Currently Dewez has two IBM 370/158 mainframes in his charge, each with 2M bytes of main memory and backed up by a 2305 drum, six 200M-byte 3330-11 disk drives, 18 100M-byte 3330-1 drives, 19 Model 3420 tape units, three 1,100 line/min printers and punched card input equipment.

Although the second of the 158s was installed only last April, one of the mainframes is "100% saturated," according to Dewez, and he is already mulling over upgrade alternatives.

These have been narrowed down to three. Petrofina is a long-time IBM customer and is unlikely change now, so a third 158 could be added to the collection; one of the existing 158s could be replaced by a 168 (leaving open the option of replacing the other similarly at a later date); or the company could decentralize its DP altogether, giving smaller processors to each of its major subsidiaries.

For the time being Dewez will not say which course of action he prefers. On balance, decentralization is the least likely.

The company does have some precedent, since it already relies on teleprocessing to a considerable extent and has semiautonomous DP staffs in most of its subsidiaries' headquarters (the central installation has a staff of just 35).

But Petrofina has lately spent a lot of money developing its IMS-based remote batch system as the successor to the earlier Customer Information Control System (CICS) based system, and it would be unlikely to throw all that effort out of the window just yet.

"IMS is a good package, but it causes us a lot of problems," Dewez said. "However, we are sure that once the initial troubles are over, it will be a good thing.

"At the moment it is a very difficult and demanding application because it has to be available from 8 a.m. to 5 p.m. without fail, and we have to use the backup processor to monitor its performance and anticipate problems.

"This is not easy. We've had more than our fair share of trouble with its introduction."

Nevertheless, Petrofina is sticking with IMS and phasing out the earlier CICS systems. It also provides a highly popular time-sharing service for non-RJE terminal users based on IBM's Time Sharing Option (TSO) and using Video 370 software with a mixture of 3270 and 2741 terminals.

In fact, the time-sharing service is too popular with its 39 users. "Everybody wants it," Dewez said, "and they want too much from it. It's really causing us some headaches."

Much of the company's programs are developed on the TSO system, and it is used in preference to punched cards for job entry as well.

The company's teleprocessing applications are handled by two 3705 front ends via 10 international leased lines linking the Brussels center with Petrofina subsidiaries in Britain, the Netherlands and West Germany.

The leased lines are all either 4,800- or 9,600 bit/sec. One 3705 can handle all these connections; the second is there primarily as a backup, but also in anticipation of expansion once the IMS package has really settled in.

Both mainframes work under OS/VS-2, loosely coupled with ASP. One supports Video 370, RJE, CICS and TSO; the second provides backup and supports IMS and batch.

Petrofina is a committed renter when it comes to computer equipment, as it has to be to support its replacement habit (it has been through seven separate mainframes in 11 years, since it switched from Bull GE to IBM) and to attain the level of flexibility it needs.

The rental commitment has only wavered once, when one of the current mainframes was purchased outright, and this may in fact provide a pointer to the company's eventual upgrade plans.

"We don't use add-ons, although we have done so in the past," Dewez said. Of course, it was not always like this.

"We did use Memorex disk drives three years ago," Dewez recalled, "and they caused no problems. But that was with a batch 360/40 – a quite different situation.

"Now, with all these interconnections between the two machines, things have become very complicated, and when anything goes wrong it is hard to pinpoint the source of the trouble. We can't do that any more. Sure, IBM equipment is expensive, but what can we do? The system must run – and without breakdowns."

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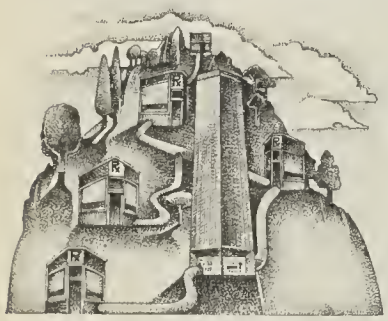

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After Study of Keypunch Alternatives

Tenn. Center Saving $4,000/Mo With Key-to-Disk

CHATTANOOGA, Tenn. – "An expanding customer base, several new applications and a mounting volume of cards convinced us it was time to examine alternatives to keypunch data entry," according to William A. Pearce, data entry manager for Data Processing of the South (DPS) here.

"The three million records we process each month simply had outstripped keypunch capabilities. The conversion to a key-to-disk system," Pearce continued, "has enabled us to accomplish the impossible while cutting total data entry costs by $4,000/mo."

"Using fewer machines and fewer full-time operators, we have improved productivity by 20% in all product lines. With key-to-disk we are able to compete for, and obtain, contract data entry jobs that were just not feasible with keypunch equipment," he added.

With the preprocessing capabilities of key-to-disk, errors reaching the mainframe have been reduced 50% and card costs have been all but eliminated, saving DPS over $3,000/mo; he said.

DPS, one of the largest independent data centers in the Southeast, processes a wide spectrum of applications, including contract data entry, general business packages, custom job processing, industry package processing and an on-line credit union application. The firm employs over 150 people, including 70 full-time and part-time data entry operators working three shifts a day.

Keypunch Problems

Prior to the conversion to key-to-disk, DPS entered all data on IBM 029, 059 and 129 card punchers and verifiers. The most obvious factor burdening the card system was economics.

"The biggest problem we faced was the rising cost of cards," Pearce said. "With $60 to $70 per keypunch/mo in card expenses and over 50 keypunches, cards were costing us well over $3,000/mo."

Card storage, the possibility of damage or loss of cards and the lack of input edit capabilities contributed to what Pearce termed the "natural inefficiencies of large volume card input to the mainframe."

Thus, when DPS began examining alternatives to card input, the questions of cost (both labor and card costs), card handling and storage and input edit capabilities ranked high on its list of system criteria.

Once a given job had been keyed and verified, it was sent to the mainframes (IBM 360/50 and 360/75) for processing. All errors had to be caught in a mainframe edit run and then returned to the Data Input Department for reentry and reverification.

Final job processing was thus delayed pending the second edit pass. Data management problems were multiplied in such an environment because normal card storage and handling problems were repeated for each edit run.

Turnaround time was delayed and card and labor costs were added to the overall cost of each job. Also, multiple edit runs increased mainframe processing costs by necessitating duplication of edit passes and by tying the mainframe to the relatively slow card reader for extended periods during each processing day.

Additionally, the card system did not offer output reformatting, and data had to be keyed according to mainframe requirements. Many errors resulted from the inability to key data to a logical left-to-right, top-to-bottom flow.

Multiple types of source documents, ranging from microfilm to handwritten documents, had to be keyed into formats which did not match the source document format. The end result was slower keying rates, because entry operators were forced to visually jump around the source document to find and key data in the required order, Pearce said.

Extensive Vendor Comparison

DPS conducted a study of 10 data entry systems, including six key-to-disk systems. An important phase in DPS' research involved visits to user sites of the vendors under examination, at which time the users were asked a standard series of questions.

Included in DPS' questionnaire were three broad categories of inquiry: equipment selection, equipment capability and reliability and employee reaction to the currently installed system.

Included in the equipment selection category were questions regarding equipment type (both peripherals and CPU), duration of system installation, criteria used in the selection process, type of benchmarks run on the system, reasons for replacement of previous equipment and, finally, what kind of future the user saw for his present system.

Lastly, Pearce asked the user if he might interview the data entry supervisor to get his reaction to the system.

Choice Narrowed

The answers to these questions were compared and evaluated and, ultimately, helped DPS narrow the list down to six vendors – all key-to-disk manufacturers.

After a thorough evaluation of the user questionnaires on these key-to-disk systems, DPS compared the six vendors on the basis of disk utilization, programming flexibility and preprocessing capability.

Each key-to-disk system was benchmarked using actual DPS applications, and it was not until after the benchmarks were completed that the cost factor was considered.

DPS finally chose an Entrex system on the basis of its dynamic disk allocation, programming simplicity and edit and preprocessing capabilities, Pearce said.

In July 1974 DPS installed an Entrex System 380 with 16 keystations and a 2.4M-byte disk and a System 480 with 24 keystations and two 2.4M-byte disks.

"With the conversion, DPS' revenues have increased despite a tough economic year," Pearce stated. He attributed the increase to three major cost savings – cost control in data entry, reduction in personnel costs (due to attrition) and mainframe hardware cost reduction.

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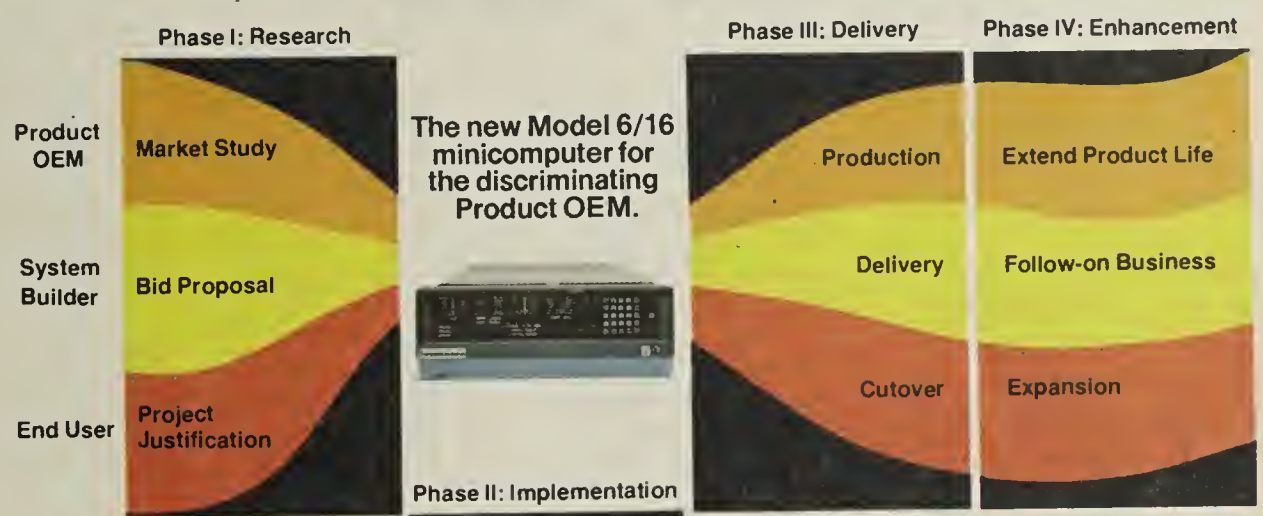

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University Automates Test Scoring for Result Analysis

FORT WORTH, Texas – "Testing, measurement and evaluation" are important at a university, according to Dr. Gary Lipe of Texas Christian University (TCU). "Otherwise, how do instructors know whether they are achieving their course objective and doing it efficiently?"

However, frequent testing can mean heavy demands on teachers' time. TCU met this challenge a year ago by switching to electronic test scoring, according to Lipe, who is director of the university's Instructional Services Program.

"We started with a Datronics Model 550 test scorer from 3M Co.," Lipe said. "This unit can process a 50-item exam in 1 sec, marking incorrect answers and recording the number correct.

"It's a great time-saver, but it only went so far. We reasoned: couldn't a test scorer that can do this for us also store, analyze and evaluate the information obtained in our test procedures?"

It could, TCU found when it installed 3M's Datronics RST 5500 data analysis system, which consists of a data entry form, a reader/scorer and an interface unit that converts raw data to computer-readable form.

The process requires no card or tape punching (one of TCU's specifications in choosing a system), and permits statistical item analysis to be delivered via a display or printout terminal.

The 5500 is connected via telephone to the TCU Computer Center.

Five programs currently in use produce descriptive statistics (range, variance, standard deviation, mean, median and mode); summary group performance data (raw scores, frequency, cumulative frequency); histograms (visual graphs of group performance); individual student performance data; and individual item performance data.

Instructors can request any or all reports on each exam; the service is free.

Lipe's goal is to provide 24-hour service on 95% of material received and two-day service on the remaining 5%. "Usually, if instructors bring score sheets in the morning, their computer printouts are ready the same afternoon," he said.

The data analysis system receives heaviest use during midterm and final exam weeks, but some instructors also utilize it for weekly quizzes.

Although many tests are being converted to a multiple-choice or true-false format, the written (or essay) type of exam will never be eliminated, Lipe said.

"The appropriateness of one type of exam over another depends upon many factors. All we are saying is that, when an instructor wants to give an objective test, this system is an economical way to analyze results and provide fast feedback."

The system already has demonstrated its adaptability in areas other than test scoring, Lipe said. Faculty and administration evaluations, which previously took weeks to analyze, were fed into the system; over 25,000 evaluations were processed in 40 hours, with each instructor receiving a printout summary of his performance.

With Lipe's assistance, another program is being written to facilitate tabulation of student government election results.

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Large-Scale Site Set to Take On Energy Research

LIVERMORE, Calif. – A national computing center for research into controlled fusion – sometimes called "the ultimate energy source" – is being established here at the Lawrence Livermore Laboratory.

A large-scale Control Data Corp. computing system including a Cyber 76 and a Cyber 70 Model 73, has been installed at the center under an $8 million contract. Funds for the computers were provided by the Energy Research and Development Administration (Erda).

The Livermore Laboratory, operated by the University of California for Erda, has been designated the central site for computing activities related to the Federal government's controlled thermonuclear research project.

Other Erda sites and several universities engaged in controlled fusion research will be served by medium-scale computing systems which will be tied into the Livermore center.

"By 1980, physicists estimate, the need for theoretical studies in energy research will be so great as to require the equivalent of 20 CDC Cyber 76 computers to carry out the job," according to Dr. Sidney Fernbach, head of the Livermore Laboratory's computation department.

Erda believed the most viable approach was the establishment of a large central site computing facility, with smaller computers in other research laboratories to accomplish local processing. "Large particle simulation and fluid calculations will be sent to the central site," Fernbach said.

"If this arrangement is successful, which we have every reason to believe it will be," Fernbach said, "other programs will follow suit."

Save $2.9 Million in One Year

DP-Generated Lists Help County Cut Welfare Costs

Special to Computerworld

COLORADO SPRINGS, Colo. – Computer-generated listings have brought about a sharp decrease in the welfare costs that once threatened to absorb more than half El Paso County's entire budget.

Aid to Dependent Children (ADC) payments went down almost 25% in the first year of the program. Continued application of the program has resulted in a 3% annual drop in welfare costs, officials said.

In 1972, El Paso County saw its ADC case load rise from 2,830 to 3,170 in the last seven calendar months. Officials were forced to think in terms of a $15.9 million welfare budget for fiscal 1973 – over 50% of the county's total budget. ADC alone would come to $9 million – this in a county with a population of 236,000.

Worried commissioners set up a welfare investigation unit headed by Robert L. Russel, district attorney for Colorado Springs Russel and Alfred Gillen, director of county social services, called in El Paso's software and application contractor, Data Management Associates.

The private firm manages the large-scale Digital Equipment Corp. Decsystem-10 the county jointly owns with the largest school district in the area.

Russel and Gillen wanted to learn just how much fraud was involved in swelling welfare costs. They also wanted the computer to check into the possibility of administrative error, with its consequent unauthorized payments to clients.

Duplicate Payments Uncovered

In February the system's storage files were used for an initial sample match of welfare names and mailing addresses. Duplicate payments turned up, some going to the same home under different names. Misspelled names, incorrect addresses and address changes were routinely adjusted by the computer.

On the basis of the matching program, officials were able to write letters to those persons whose claims were questioned. New interviews were scheduled and some clients, shown computer findings, voluntarily withdrew from the rolls.

No cases of outright fraud were uncovered, but the ADC case load dropped from 3,170 to 2,985 in the initial four months.

Armed with the corrected lists, officials felt they could proceed into another area where substantial savings might be made. They could now question those fathers and stepfathers who, for one reason or another, failed to contribute to the support of their families.

The computer system was used to check child support payments against welfare files. Fraud turned up almost immediately – children, supposed to be home, were at other addresses.

Employing this data, officials were able to get in touch with over half the parents and point out obligations.

The computer was also able to provide a list of those stepfather cases in which children were listed on ADC rolls. In most instances, a stepfather is not legally bound to support the children of a previous marriage, but the investigators were interested in finding out if some stepfathers had not been claiming children as tax exemptions.

Support actions were initiated in certain instances. Of the 335 cases investigated, 212 were closed; grants were reduced in the case of another 80.

As fathers assumed legal liability, the burden to the county was again relieved. ADC mothers continued receiving welfare money, but the Welfare Department was reimbursed from court registry support payments.

In all, 337 cases were examined. Sixty-one clients failed to respond to county letters; 29 did not appear for the interview; four voluntarily withdrew. In the end officials were able to remove almost 100 names from the rolls.

School Files Next

By mid-year the investigators were able to approach school district officials and use their data files for the correct names, addresses and birthdays of school children. An initial comparison showed there were questions on the status of 380 youngsters – 84 mothers apparently were receiving aid for children who were actually in foster homes.

At the end of the year El Paso found the overall results heartening. ADC cases alone were down 23.8%, 32% below the projected figure. Instead of an increase, savings totaling $2.9 million were realized and $900,000 was recovered in overpayments.

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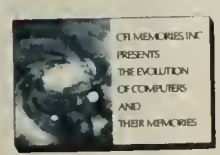

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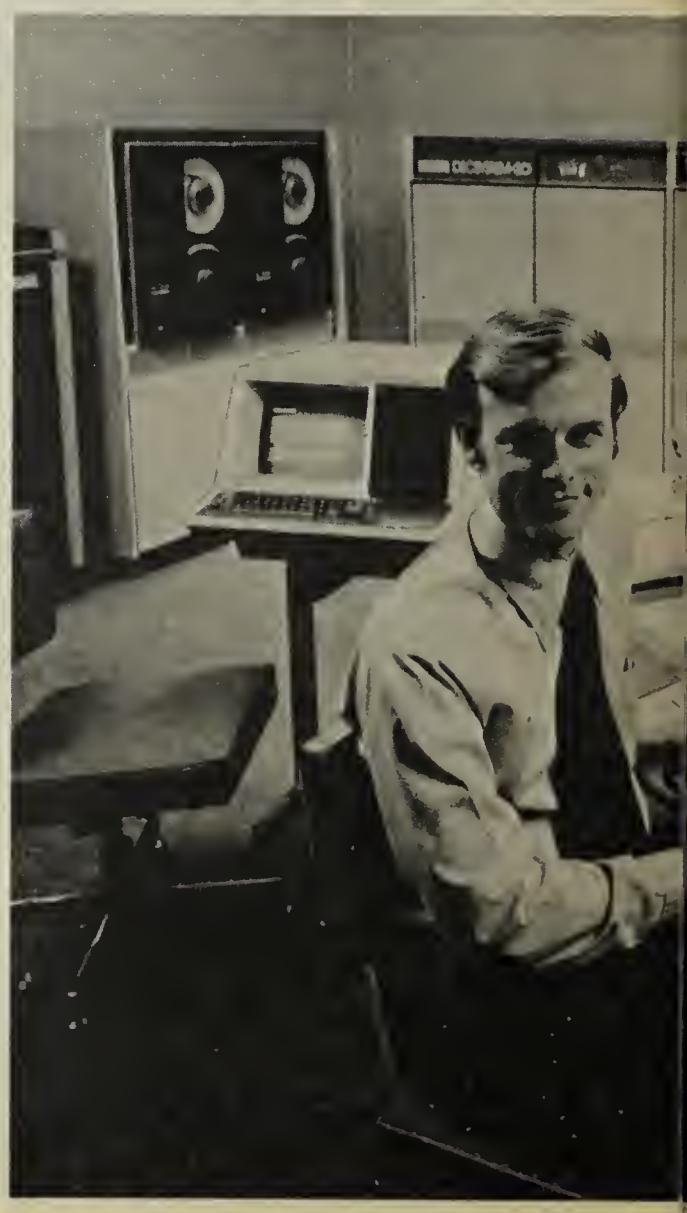

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From Payroll to Crime Recordkeeping

Swedish Police System Handles Mixed Bag of Chores

Special to Computerworld

STOCKHOLM, Sweden – The computer system operated by the Swedish State Police handles a comprehensive bag of administrative chores ranging from payroll to inventory control, including virtually every aspect of police work and many relating to the administration of justice.

Implemented on a Univac 1110 multiprocessor, the system also supports a nationwide communications network.

The operation began in 1968 with the installation of a General Electric (GE) 400 system.

During the next few years, this configuration was more than doubled in size. Nevertheless, by early 1971 it was apparent that far more power would be needed.

The 1110 system, selected on the basis of hardware expandability, communications handling, the data base management and other software and the quality and amount of local support service, is eight to 10 times more powerful than the system it replaced and is expected to meet data processing requirements until 1980 at least.

The 1110 computer system configuration includes 96K bytes of plated wire and 262K bytes of extended memory, 18 Uniservo 16 tape units and 32 8440 disks.

Set Up Committee

Since 1967, shortly after the go-ahead had been given for the police administration system, the government set up a committee to coordinate the DP requirements of police, criminal courts and correctional authorities.

Comprised of representatives from the Departments of Justice and Finance, the State Police, the Chief Public Prosecutor, the courts, the National Correctional Administration, Central Bureau of Statistics and State Office, this committee has ever since exercised a supervisory function.

A National Office of Organization and Management has also, for some years, coordinated computer policies within the government as a whole and has developed and enforced common technical standards.

Swedish citizens were willing to accept a system that allocates a unique number to each at birth and employs this universally for identification.

The national police force has legitimate access to some information collected primarily for other purposes and held in computer files by other government agencies.

Public tolerance is, perhaps, reinforced by the availability to the private individual of some of this state-held information.

If he wants to check whether the used car he proposes to buy is the legal property of its vendor and holds a current road license, any citizen can ask his local police station to interrogate on-line records.

Privacy Laws

As a counterbalance to this permissiveness, though, Sweden recently passed legislation to protect the privacy of the individual against the potential depredations of the data base age. This puts it among the few countries which have taken positive action in that respect.

One of the impressive features of the system is the service it provides for other law enforcement or administration agencies.

A passport register, for instance, has been in use since 1968. It details all passport owners and passports that have been renewed, are expired, void, lost found or stolen.

Each month, a list of those in all categories but the first is distributed to the customs authorities as well as to the police.

Work is currently under way to extend this routine to include an on-line passport register with a view to automatic printing and issuance control in the future.

The large subsystem devoted to judicial information includes several routines, all linked in one way or another. Hub of the system is a criminal records file which, organized as a general data base, contains some 680 million characters relating to almost 500,000 persons.

Initially built from historical records of convictions and suspected criminals, this file is now mainly updated with the output of three large routines. These each year provide details of around 130,000 court sentences, 60,000 summary punishments and 160,000 suspect sheets.

Other sources of information include Sweden's Correctional, Internment and Youth Prison Boards, the Bureau of Statistics, Interpol and the police of other countries.

The main purpose of this system is to provide information for the law enforcement authorities.

Crime Investigation File

Exhaustive information, for example, is held on the on-line crime investigation file.

Information that can be extracted from it includes a listing of the identification papers used in crime, banking or other accounts that have been abused, names and aliases used and crime types split into six categories ranging from bank robbery to crimes against the elderly.

Crimes in which a suspected person and/or stolen motor vehicles have been registered can also be listed.

Search keys into the wanted-persons file include the personal identification number, date of birth, surname plus appropriate age (the search covers five years plus or minus a given date).

Security is naturally an important consideration for any police system. All terminals are installed on police premises where they are inaccessible to unauthorized people.

Nor can they be used even by a policeman until he inserts his identity badge into a reader. Each badge is also coded so that its owner may interrogate only certain files or parts of these and can initiate only a limited number of transaction types.

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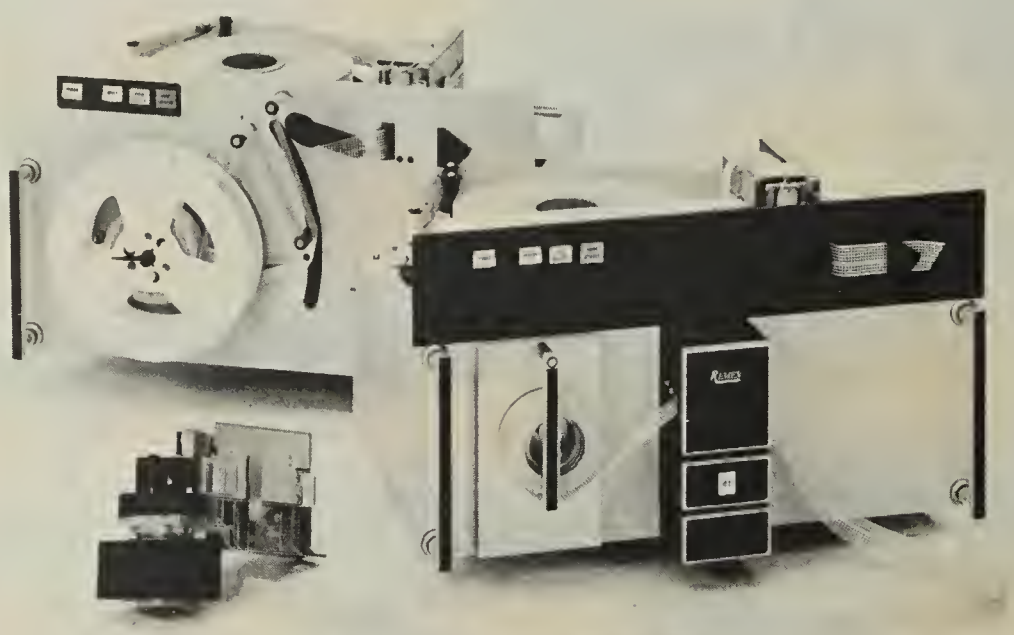

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Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time-sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	Hilton	May 10-11
Chicago	Hyatt Regency O'Hare	May 17-18
Wash., D.C.	Stouffer's National Center Inn	May 24-27

Data Communications Course #1010 – Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

Chicago	Hyatt Regency O'Hare	Mar. 15-16

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

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Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

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John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

Chicago	Hyatt Regency O'Hare	March 8-9
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Note: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

Mini Bits

NCR 299 Gets Pad Buffer, Magnetic Ledger Device

DAYTON, Ohio – A magnetic ledger device and 10-key pad buffer are available for NCR Corp.'s 299-0200 system.

The magnetic ledger device, which mounts directly on the 299's basic forms handler and can be installed on existing units at the user's site, costs $3,200 or $123/mo.

The 10-key pad buffer has a capacity of one word or 16 digits plus a sign and permits faster input of numeric data, NCR said.

The purchase price of the buffer is $210, and the unit can also be installed on existing systems, the firm said from Dayton, Ohio 45479.

Infotek Extends HP 9830A to 32K

COVINA, Calif. – The EM-30 Extended Memory System from Infotek Systems expands the memory capacity of the Hewlett-Packard (HP) 9830A Basic programmable calculator to 32K bytes, according to the firm.

The EM-30 is a plug-compatible replacement for the standard HP memory and is fully contained in the HP 983A memory, a spokesman said.

The system occupies the same two card slots as the standard HP memory, he added, and features full compatibility with all 9830 Basic software and HP read-only memory options.

The replacment memory costs $4,230 from Infotek at 733 East Edna Place, Covina, Calif. 91723.

Nashua Packs Hold Calcomp Drives

NASHUA, N.H. – A series of five-high disk packs for California Computer Products, Inc. (Calcomp) Trident disk drives is available from Nashua Corp.

The 4460 series is removable and interchangeable, Nashua said.

The disk packs can store 27.4M-, 54.7M- and 82.1M bytes of data and are compatible with the Calcomp T25, T50 and T80 drives respectively, a spokesman said.

The packs cost about $340 in OEM qunatities from Nashua at 44 Franklin St., Nashua, N.H. 03060.

NEC Plans Mini, Micro Courses

ST. CHARLES, Ill. – The National Engineering Consortium, Inc. (NEC) will hold courses on system design using micros and minis, minicomputer principles and applications and microcomputer principles and applications at Pheasant Run Lodge here March 28 to April 2.

The courses will cost $595. Information is available from NEC at Oak Brook Executive Plaza No. 1, 1301 West 22nd St., Oak Brook, Ill. 60521.

City Outgrew Batch

Mini Ends Search for Data Base System

By Esther Surden
Of the CW Staff

REDONDO BEACH, Calif. – When this city's data processing demand exceeded the capabilities of its batch-oriented system, the town began a search for a data base management system that led to a minicomputer.

The town had clearly outgrown its NCR 50, according to Robert Foy, Redondo Beach's DP manager. The leased NCR 50 had grown from 10 disk packs to 50 between 1971 and 1975, and programming was a complicated and time-consuming task.

"I realized we had reached a point where we either had to upgrade the NCR batch system or find an alternative," Foy said.

Upgrading the batch system had several drawbacks. The programming would still be difficult, he said, and the upgrading procedure would require large expenditures without meeting the city's on-line real-time needs, he said.

After attending many conferences, Foy, who has had fifteen years of DP experience, went to a seminar at the University of California at Los Angeles on comparative data base management computer systems.

Most of the systems demonstrated were large-scale and too expensive for the city's budget, Foy said. The Microdata Corp. Reality business system was the only small system demonstrated, he added.

After the conference, Foy visited several operational Microdata sites, asking questions and assessing the minicomputer's reliability, he said.

City Determined Criteria

After watching the machine in action, the city decided to determine several criteria for any system it would choose.

Vendors were assessed as to their data base management software first and their hardware second. Ease of programming was a big plus.

Hardware criteria included the ability to have a large number of CRTs, expand core and on-line memory and have on-line recording for cash transactions and remote printers, he said.

The field was narrowed to two vendors, Foy said. The second vendor, whom he would not name, submitted a proposal for a system that was comparable to Microdata's but cost 2-1/2 times more than what Microdata had bid.

"The only way we could have afforded the second vendor was to join in a consortium with two other cities, and we didn't want to do that," Foy said.

After the decision to acquire and convert to the Reality system was made, the next decision was whether to buy or lease. The NCR 50 was costing the city $30,000/year, and the Reality system would cost $150,000 in total. When careful cost-factor analysis was made, the city determined that buying could realize $100,000 in personnel and equipment savings, a spokesman for the city said.

The system, delivered in July of 1975, had a Microdata 1600 CPU with 64K bytes of core memory, 20 CRT terminals, magnetic tape, 40M bytes of on-line sotrage and a 300 line/min printer, Foy said.

Two terminals were distributed to the parks and recreation department for reservations of tennis courts, banquet facilities, athletic equipment and coordination of community events. Two more are located in the City Treasurer's office for general revenue, utility billing and business license collection.

The library uses its two terminals to keep track of loans, fines and inventory. Other terminals are in the Human Resources Department, Personnel, Purchasing, the City Manager's Office, Community Development Department, General Services and police and fire departments.

One of the chief advantages of the system is its ability to handle customized reports, Foy said. The person requesting the information must enter the request in Microdata's English language instead of burdening the DP department.

The old system would have taken two or three days to complete the assignment, but, with the Reality, the reports are available quickly, Foy said.

Wang Disk Multiplexer Allows Four 2200s to Share One Drive

TEWKSBURY, Mass. – The Wang Laboratories, Inc. Model 2230MXA/B disk multiplexer allows up to four System 2200 processors to share a single disk drive on which each processor's data is stored as part of either a common or split data base, the firm said.

Access to the disk drive is on a daisy-chain basis, Wang explained, with a master controller polling each processor sequentially on an equal priority basis to see if it is calling for access to the disk.

If so, the inquiring processor takes command, and a single disk statement or command can be executed. Multisector transfers can be made by a single statement, Wang said.

In a case of a major on-line update from one processor to disk-resident files, one processor can temporarily gain access to the disk via a programmable "Hog Mode" feature, which locks out other systems, according to the firm.

The Model 2230MXA/B is installed by replacing existing disk controller boards with multiplexer boards. It is also $700 less costly than the earlier Model 2224 multiplexer, a spokesman said.

Usage of the multiplexer does not impair or require alteration of any software used with a Wang WCS/20, WCS/30 or System 2200 processor, Wang said.

The Model 2230MXA/B is priced at $800 for the first processor and $500 for each of three additional processors linked in the chain from the firm at 836 North St., Tewksbury, Mass. 01876.

DG Machines With Fortran IV Get Floating-Point Processor

SOUTHBORO, Mass. – Fortran IV-equipped Data General Corp. (DG) minicomputers can now use the firm's hardware floating-point processor, the firm said.

Previously the processor was only supported by Fortran 5, a spokesman said. The processor operates in parallel with the CPU to perform single-precision and double-precision arithmetic with up to 15 digits of precision, DG said.

Fortran IV and the processor operate on Nova 3, Nova 2, Nova 830, Nova 840 and Eclipse S/200 and C/300 minicomputers under all DG operating systems, the firm said.

The floating-point processor costs $4,000 for a Nova and $5,000 for an Eclipse, the firm said.

Fortran IV with the floating-point extension is immediately available to users with a licensed hardware configuration for $10 on paper tape and $20 on magnetic tape from the firm at Rt. 9, Southboro, Mass. 01772.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Mini Performs Administrative Functions for College

By Esther Surden
Of the CW Staff

DRYDEN, N.Y. – The Tompkins Cortland Community College here is using its minicomputer to perform all the administrative functions to manage the school, a spokesman said.

The seven-year-old college has grown to a student population of over 2,000 and is using the Varian Data Machines V73 mini to perform payroll, general ledger accounting, registration, enrollment, state and federal statistical reporting, inventory and library recordkeeping applications.

Prior to ordering its V73, the college was using a local service bureau, Sage Action in Dryden.

The bureau was running the college's programs on an IBM 1130 batch machine. When the college grew so much that the applications were too much for the IBM machine, the bureau suggested the college consider buying a minicomputer, he continued.

Eleven vendors submitted bids for the project. The college presented a list of specifications for both the hardware and software and used the specification as criteria for bid acceptance, according to Tom Mecca, assistant to the president for planning and development.

When any points were unclear, the university asked for more documentation from the vendors.

Finally the field was narrowed to two prospects, Varian and Modular Computer Systems, Inc. (Modcomp), but the Modcomp bid was higher, Mecca said. "By law we had to choose the lower of the two bids or point out why the lower bid didn't meet our needs," he continued. A consultant with Sage indicated the machines were comparable so we went with Varian's low bid, Mecca added.

The system hardware includes a 32K-word processor, a 300 line/min printer, a 300 card/min card reader, 50M words of on-line disk storage, a teletypewriter console and two Hazeltine Corp. CRTs. The Varian components cost a little over $70,000, Mecca said.

The college is now undertaking a two-step conversion from the batch-oriented system. First, all programs written in Fortran for the 1130 were converted for use on the V73, still maintaining their batch orientation.

Next, these programs are in the process of being rewritten to reflect the additional capabilities of the mini, and new programs are being written.

A main concern of the college is to have an integrated data base. With the batch-oriented system, programs could not share the same data. With the V73, the student accounting file will be set up at the same time as the student registration file, Mecca added.

Also, by using data kept current by the registrar, such as enrollment figures, as well as the accounting data file maintained by the college treasurer, the system will develop cost comparisons of each of the college's curricula.

Registration is now accomplished through the standard forms the student fills out, Mecca said. When the CRTs are operational, all data will be entered through them, and the responsibility for correct data entry will be traceable to the CRT user.

System maintenance is split between Varian for the hardware and Sage for the software, Mecca said. The Varian service has been reliable.

The software maintenance is covered by a three-year service contract, Mecca said.

Only one staff member is needed to run the Varian machine, he added. She was recruited from existing personnel and trained by Sage.

Unit Converts Metric Measures

DETROIT – A desktop weights-, measures- and metric-conversion calculator is available from Burroughs Corp. here.

The C6451 is an office display and print calculator that can add, calculate or convert in various units of measurement, the firm said.

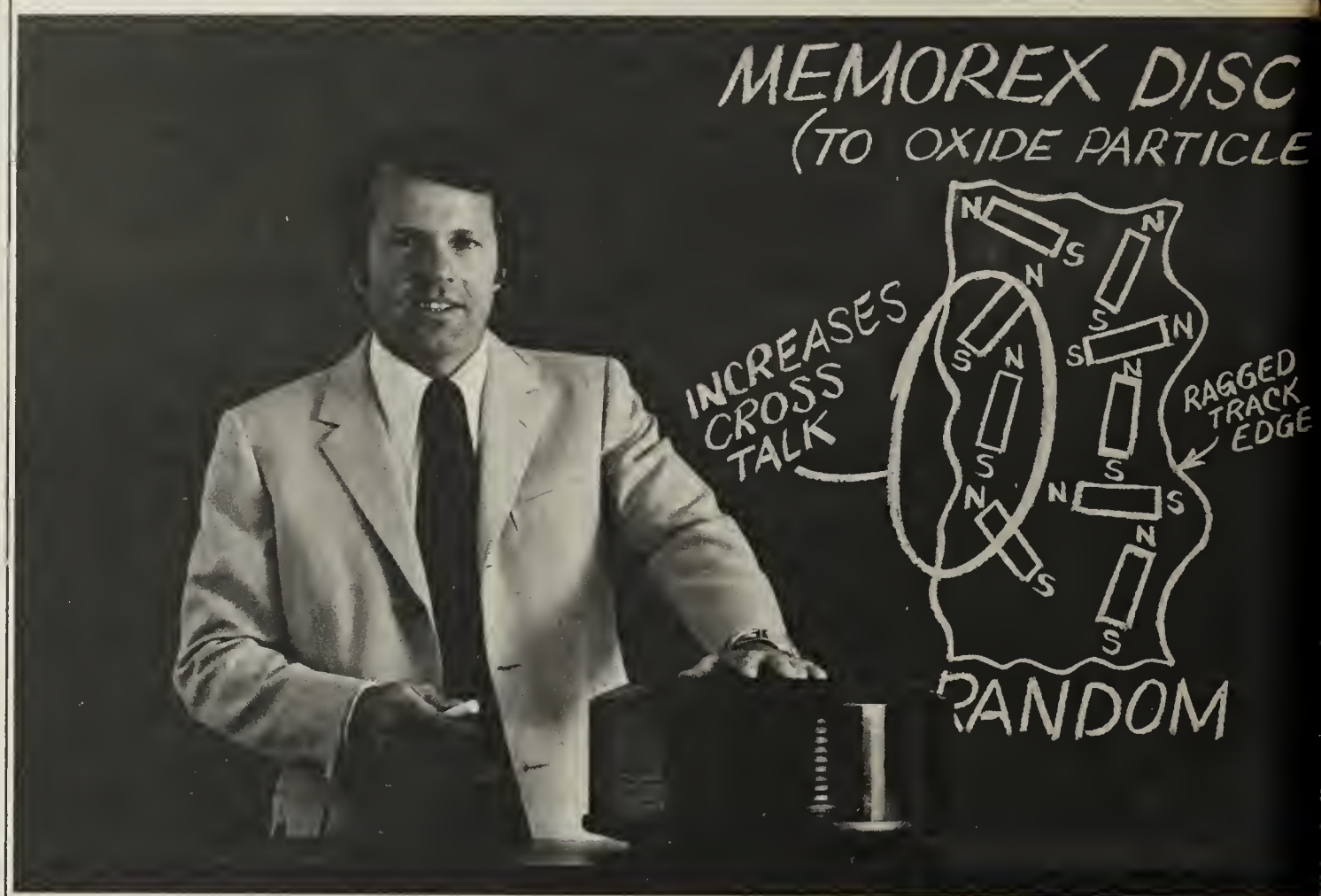
The calculator is designed for the construction, transportaion, textile, food processing and packaging industries.

It can perform area calculations in yards, feet and inches; volume calculations; price-per-unit calculations; conversion to and from metric as well as to any equivalent units; and calculations involving fractions, a spokesman said.

The C6451 combines a standard calculator keyboard with unit entry keys for the different measure systems.

The values and functions of the different measurement systems are stored in microprogrammed read-only memories which are accessed by three interchangeable program activator panels, Burroughs said.

Purchase price of the basic C6451 calculator with one program activator panel is $695. Prices range from $695 to $795 depending on the number of program activator panels provided by the firm in Detroit, Mich. 48232.



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For Net of Catalog Showrooms

Real-Time System Watches Inventory in 500-Mile Area

By Mal Stiefel
Special to Computerworld

PHILADELPHIA – Local retailer Basco, Inc. has been using a real-time minicomputer-based system for inventory control and order entry at nine of its catalog showrooms in New Jersey, Pennsylvania and Delaware.

The system, installed in 1973 in a single store, has expanded to cover 10,000 catalog items and more than 5,000 noncatalog items carried at each location in the 500-mile network.

AW Consultants of Cherry Hill, N.J., designed and installed the system, which is based on a 24K Digital Equipment Corp. PDP-11/40 and a 16K PDP-11/05.

Peripherals include a 56M-byte disk drive; two 2.4M-byte disk drives; two 800 bit/in. magnetic tape units; a 16-line multiplexer; and a high-speed printer.

The centrally located hardware supports 70 terminals in the various stores, tied together over leased telephone lines.

On-line programs are used for order entry in sales areas, issuance of merchandise orders to the warehouses, invoice preparation and inventory update as shipments are received.

In addition, payroll, accounting, sales analysis and mailing list functions are provided off-line.

The firm used a manual inventory control system until the automated capability was installed. In 1972, a study was conducted to determine whether computerization was feasible, but the conculsion was reached that equipment was "too expensive," according to Alex Egyed, Basco's president.

AW Consultants then came along with an acceptable proposal, Egyed said, so design of the present installation was begun.

How It Works

When a customer requests a particular item at the showroom a clerk keys the item identifier into a CRT terminal; the display shows the status of that item in the showroom, including available quantity and price.

Prices are stored in the computer but not marked on the goods; this facilitates changes in pricing when they are necessary, according to Basco.

If the order is made, the available inventory is reduced immediately and a slip is printed in the warehouse, directing personnel to the bin where the item can be found.

At the same time, an itemized invoice is printed in the sales area for the customer. The customer pays, picks up the order and leaves.

If the item isn't available, the sales clerk can request a display of the availability of the same item at another showroom. If the item is in stock at another location, the customer can place an order to hold the item until he can pick it up. Or it can be delivered to the showroom in his area.

Orders may be paid for in advance or on pickup; the computer keeps track of this detail.

When shipments of merchandise are received at the warehouses, the item descriptions and quantities received are entered into the data base from the shipping and receiving terminal. Thus, the received goods are made available to all the stores in the network right away.

In addition to the in-store inventory network, termed "Tel Serv" by Basco, the company introduced a customer service called "Tele-Mail," in which customers can place orders over the phone.

Sale Showed Effectiveness

The system's effectiveness as a management tool was demonstrated at a recent three-day sale on a particular curling iron, according to a Basco spokesman.

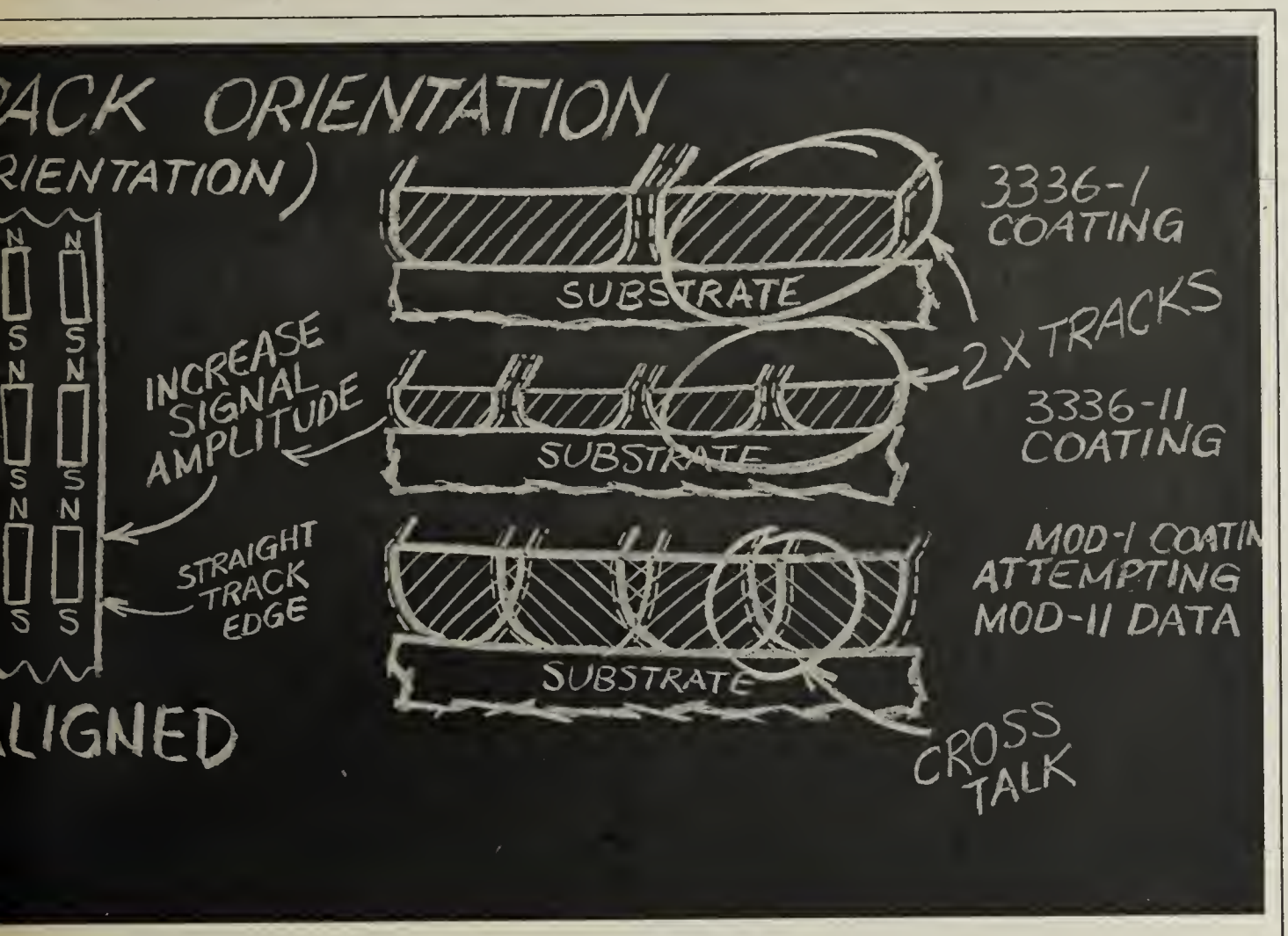
On the first day, Basco's purchasing agent watched the progress of the sale each hour on his CRT. By the afternoon, he concluded the original shipment would be sold out by that evening, so he was able to order another shipment of the curling irons from the supplier.

The second day's shipment, too, sold out, but the purchasing agent was again able to react in time to get enough curling irons for the last day of the sale.

Without the real-time system, the purchasing agent never would have had enough information in time to make the second and third buying decisions, Egyed said; in that event, most of the sale customers would have been disappointed, and the effectiveness of the sale would have been diminished.

Customers and employees like the system, he added.

DEC supplies hardware maintenance; AW Consultants, the system designer, continues to maintain the software.



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Computer Security Institute announces two new workshops designed to protect your installation from fire, fraud and negligence.

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The objectives of this workshop are: 1) To convey the importance of risk evaluation and why it should be the first step in any computer security program. 2) To provide a thorough understanding of how to evaluate and classify risks, and quantify threat probabilities and loss exposures. 3) To provide a methodology for evaluating countermeasures on a cost benefit basis.
Threats Vnlnerabilities - Risk analysis begins by methodically isolating and quantifying potential DP loss exposures. Questions about the consequences of these exposures will be examined in detail. For example, what would happen if your DP operations were disrupted for an hour, a day or a week? What would the cost be to replace your hardware, critical programs and data files? And how would the alteration or public disclosure of your proprietary data files affect your organization? Following the identification of these loss potentials, we'll evaluate the threats that produce them. They include natural disasters like fires, floods and earthquakes, technical malfunctions like communications breakdowns or air conditioning failures, and the problem of unintentional human errors, and problems deliberately caused by unethical employees and outside perpetrators.
Probabilities of Occurrence Annualized Loss Expectancies - After the identification of loss exposures and threats to your organization is complete, the next step in quantifying DP risk is to establish a probability of occurrence for these threats. For some types of threats - fire, tornado and power outage, for example - estimating the probability of occurrence can be relatively easy. The process of estimating the probability of occurrence for other types of threats can be much more difficult, as in the case of fraud and sabotage. You'll see how these probabilities are generated, and you'll be shown how to apply them. Determining an annualized loss expectancy is the final step in quantifying risk. It is the product of the potential dollar loss and the probability of occurrence.
Conntermeasnre Selection - We'll show you how the risk analysis output ties directly into the evaluation of various risk reducing alternatives. The cost effectiveness of a proposed security system or procedure can be determined by comparing the cost of the system to the annualized loss it is expected to reduce or eliminate. Having gained the ability to make these comparisons, rational decisions can now be made as to the appropriateness of physical and data access control systems, UPS, back-up air conditioning, fire protection and other preventive and remedial alternatives.

2. Physical Security & Disaster Recovery
The objectives of this workshop are: 1) To provide you with an overview of the nature and scope of physical security, vital records and disaster planning, and demonstrate how they relate to the overall computer security program. 2) To help you identify physical threats and evaluate the cost effectiveness of various protection mechanisms, including physical access control systems, fire detection and control systems, uninterruptible power systems (UPS), and water, temperature, humidity and dust control systems. 3) To develop a framework for disaster recovery planning which will be useful in designing and implementing your own program.
Physical Security - How it fits into the total program
An overview of physical threats, including fire, flood, tornado, earthquake, vandalism, temperature, dust and humidity.
Analysis of protection principles: Threat removal and threat isolation.
How to conduct a vulnerability survey. . .and what to do with the results.
Facility construction and siting: selection, retrofit, working with architects, engineers.
Controlling access to sensitive areas: devices and techniques.
Fire prevention, detection and extinguishment.
The power problem:power company practices, transients, brownouts, blackouts. . how to determine requirements for protective equipment.
Water damage control: leakage, flood.
Vital records protection: how to identify and classify them. Why quality assurance?
Protection techniques: on and off-site, on-line. Implementing a vital records program.
Disaster Recovery - and how it integrates with overall organizational plans.
Local police, civil defense.
Emergency response: the need for preparedness and immediate reaction.
Site selection, legal implications.
Backup operations - compatibility, task vs. time sensitivity.
Recovery: site preparation, EDP hardware supplies procurement.
Monitoring and testing the recovery plan: DP staff, security staff, key executives.

Computer Security Institnte is a multi-service organization dedicated to providing DP users with information on how to safeguard their valuable EDP resources from damage or loss. Services include: a bi-monthly newsletter, research, a test program, computer security manual, buyers guide and seminars.

Workshop Format - an Accelerated two-day program for 25 DP professionals.

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Attendee Preparation and Research - Before each workshop we'll send you a full set of materials - and you'll be expected to familiarize yourself with it beforehand. There's a lot to pack into two working days, and this preparation is necessary to help you make the most of your time. We'll also ask you to check out your installation before the workshop begins, noting what problem areas require specific solutions.
Workathon - These accelerated two-day programs are designed for professional people who are willing to work and think hard. They are a direct response to requests from Institute members and non-members alike who have asked for practical, in depth coverage of specific topics. We recognize the need for a program geared to the individual attendee. . . a program that painstakingly explores the unique problems of each attendee and responds to those problems with practical information and useful guidance. So we've developed the "Workathon" environment because it means total involvement, and maximum benefit, for you and your company.
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Special Interest Sessions - On the evening of the first day we'll meet in small special interest groups. Feedback from pre-workshop counseling will determine the topics to be discussed. These sessions are voluntary, but you should participate because they'll focus on problem areas you've identified as important. You'll explore possible solutions and generate ideas with your peers, who share similar problems.
Awards - A rigorous examination concludes each computer security workshop. This test is designed to provide you with an objective indicator of your accomplishment. You'll demostrate for yourself how well you've mastered the course work, before you go on to apply it at your own installation. Each attendee who successfully completes this test - and passing is not automatic - will receive a personalized Computer Security Institute citation in recognition of his or her achievement.

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Skelly Oil Company, Tulsa, Oklahoma

"In spite of the criticisms offered, I learned many times more than I expected, this was a super experience. Excellent quality of information, schedule outstanding."
First Lieutenant Samuel T. Marsh
U.S. Marine Corps

Workshop Faculty

Peter S. Browne, Workshop Chairman is a manager of Security Operation for the G.E. Information Services Business Division. Prior to joining G.E., he was responsible for the development of the computer security program at State Farm Mutual Auto Insurance Company. He has dealt with security of computer information as a staff officer in the Air Force. His computer background was as a programmer, senior analyst and systems designer. Mr. Browne is active in many national professional societies, was chairman for two ACM chapters and frequently speaks on the subject of computer security.

Beiden Menkus has spent over twenty years helping management improve administrative systems and information handling techniques. He is Editor of the Computer Security Institute's *Computer Security* newsletter. He is a regular contributor to *Administrative Management* and an advisor to *Security Letter*. In 1963 Mr. Menkus founded *Records Management Journal* and edited it for five years. He is also a recent contributing editor to the *Computer Security Handbook*, and is listed in current editions of *Who's Who in Computers and Data Processing*, *Contemporary Authors* and the *Working Press of the nation*

Robert V. Jacobson is Assistant Vice President of Chemical Bank where he is responsible for Information Systems Security. His experience includes computer simulations of weapons and radar systems at Raytheon Company. He later joined Bolt, Beranek and Newman, Inc., and served as General Manager of TELCOMP, a pioneering time shared computer service. He founded Bradford Associates, Inc., and specialized in computer security consulting. As President, he directed projects for industrial firms and financial institutions. Bradford Associates merged with Sentor Security Group, Inc., in 1972, and Mr. Jacobson was Vice President of the Consulting Division until his present affiliation with the Chemical Bank. He co-authored the book *Computer and Software Security*.

The charge for each two-day workshop, including continental breakfasts and luncheons, comprehensive workbook and all course materials is $350 per registrant, payable in advance. Computer Security Institute members are entitled to a special discount: the fee for "Unbundled" members is $295 per registrant, and the fee for Full Service members is $225. Hotel fees are not included in your tuition cost, but we have reserved a block of rooms at the workshop hotels, and many of these hotels offer preferential rates. A room reservation card will be included with the acknowledgement of your workshop registration. Remember, enrollment in each workshop is strictly limited to 25 participants on a first come basis.

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Physical Security & Disaster Recovery —
Philadelphia, April 22-23; St. Louis, May 12-13; Denver, June 23-24.

For more information call the Computer Security Institute at (617) 393-3666, or send your check, made payable to *Computer Security Institutee*, to 43 Boston Post Road, Northboro, Mass. 01532.

Built Around Twin Minis

Calif. Police System Proves Match for 'Bad Guys'

SANTA BARBARA, Calif. – A minicomputer based high-speed communications system designed by PRC Public Management Services for the police department here recently proved itself more than a match for "the bad guys."

Within moments of receiving information that a robbery was taking place, a dispatcher at police headquarters had cars and men deployed around the building.

A very surprised inside man was "apprehended in the act" while his partner outside continued, ineffectually, to monitor the police radio band.

The criminals were not tipped off because Santa Barbara's 18 one-man police cars are equipped with mobile printers that receive digitally coded information on a special radio frequency not used for any other type of transmission.

Even if the signal were to be intercepted, it would be meaningless to anyone lacking the specialized police receiving equipment, police said.

According to Chief A.W. Trembly, the prime purpose of the General Utility Switching system (GUS) is just such life- and time-saving support of field officers.

Requests for Information

The Santa Barbara Police Department estimated that it gets more than 2,000 radio communications from field officers per week. Many of them are requests for information such as: Does the tag number on an abandoned automobile match a stolen vehicle?

If the officer is out of his car on investigation – as he is approximately 46% of the time – the printed report will be there waiting for him when he returns.

And the information is neither subject to distortion nor to message loss as when multiple users of conventional voice channel frequencies accidentally cut in on each other, a spokesman said.

Policemen once walked unwarned into dangerous situations because they hesitated to inconvenience citizens during the 15 minutes it took for a Teletype check of wants and warrants, the spokesman added.

CUS can provide an answer in 12 seconds, and, in the first half year of the system's operation, the number of field calls tripled, according to the spokesman.

Police officials predicted an eventual six-fold increase in requests for information over pre-GUS figures.

GUS is built around twin Digital Equipment Corp. PDP 11/40 computers – one with 32K words in memory and a backup with 24K. Each machine can handle up to 99 terminals. There are also four disk drives with a 1.2M-word capacity each and three tape transports incorporated into the system.

To Link to Clets

Eventually, GUS, which cost less than $.5 million to research and implement, will link all police and related agencies in Santa Barbara and San Luis Obispo counties with the California Law Enforcement Telecommunictions System (Clets).

Clets is a message-switching system that accesses data in the California Department of Justice, the Department of Motor Vehicles, the National Crime Information Center and other state and federal data resources.

Keyboards, video display terminals and printers have also been installed in the Santa Barbara Police Department records office and detective bureau, in the Santa Barbara district attorney's office and in the municipal courts of both Santa Barbara and Santa Maria.

Security software has been developed that restricts access to sensitive information. Criminal records are not available to mobile units, for example, and only the juvenile department may request and receive data on juveniles.

BASF Has Disk Packs For Calcomp Tridents

BEDFORD, Mass. – BASF Systems has introduced two high-density disk packs for California Computer Products, Inc.'s (Calcomp)Trident disk drives that are said to yield up to 40 times more storage at about four times the cost of a single disk cartridge.

Called the T-50 and T-80, the disk packs can be used with minicomputers and IBM System/3-type business systems, according to the firm.

The T-80 contains 80M bytes of storage at 6,060 bit/in.; the T-50 holds 50M bytes at 4,040 bit/in.

The pack contains five platters; three are used for data storage and data locating and two are used as the "cover" disks, BASF said.

The T-50 and T-80 cost "between $400 and $450" in up to 20-unit quantities, a BASF spokesman said. OEM discounts are available, he added from the firm at Crosby Drive, Bedford, Mass. 01730.

PDP-11 Gets Controller For CDC Modules, Tridents

BURLINGTON, Mass. – A microprocessor-based controller of Control Data Corp. storage modules or California Computer Products, Inc. (Calcomp) Trident disk drives is available for Digital Equipment Corp. PDP-11 systems, according to the vendor, Xylogic OEM Components Group, Inc.

The Phoenix 211 controller can include a command queuing option to eliminate CPU overhead and resolve simultaneous seeks, the firm said.

A Direct Memory Access technique permits the user to select the data transfer burst duration suitable for his application, Xylogic said.

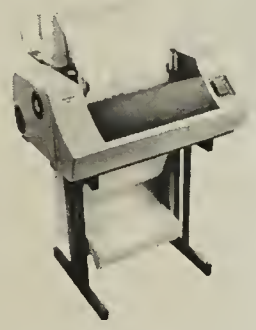
Multibus architecture permits use of multiple microprocessors to provide varying levels of disk subsystem functions such as file-to-file transfers, key searches, volume copying and disk subsystem diagnostics, according to Xylogic.

The Phoenix 211 costs $7,150. With the command queuing option, the unit costs $8,350 from the firm at 42 Third Ave., Burlington, Mass. 01803.

Time was when high speed printing meant a high speed line printer.

And so have printers. No longer is high speed line printing the sole realm of the expensive line printer.

Centronics has changed all that. Our new 103 and 503 serial impact printers can give you up to 340 lines per minute. Not only are they the fastest, most efficient serial impact printers you can buy, but, in some applications, they can keep pace with line printers costing twice as much.



How do they do it? By a unique combination of printing speed, slew rate and intelligence. Both the 103 and the 503 are 165-character-per-second, 132-column printers. Both are bidirectional – which is the intelligence part. They print right-to-left, left-to-right at 70 to 340 lines per minute. Moving to the nearest character on the next line to be printed – wherever it may be. There is no carriage return and no carriage return deadtime (in the 400 milliseconds it takes to effect a carriage return, these printers print 80 characters). A big boost for throughput.

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Admittance Programmer II Monitors Readers, Alarms

CHICAGO – The Admittance Programmer II is a microprocessor that monitors up to 128 card readers and over 500 alarm-

Micro Products

monitoring terminals, according to its vendor, the Western-Cullen Division of Federal Signal Corp.

The central controller unit permits or denies access at all card reader locations and reports invalid entry attempts, the vendor said.

It can also monitor environmental conditions including fire, flood, temperature, pressure, noise level, elevator activity and parking conditions, the firm added.

The minimum system, including a microprocessor with the Mono Vend feature which prevents passback of entry cards to unauthorized persons, two card readers, 1,000 identification card memory, a printer and the ability to program up to four different time zones a day, costs $1,700.

The firm is at 2700 W. 36th Place, Chicago, Ill. 60632.

Intel Adds SBC

SANTA CLARA, Calif. – Intel Corp. has a microcomputer that fits on a 6-3/4-in. by 12-in. board, the firm said.

The SBC 80/10 microcomputer contains the firm's 8080A CPU with interrupt control, crystal-stabilized system clock and system bus control.

The system contains 1K random access memory (RAM); 4K read-only memory (ROM), parallel I/O with 48 I/O lines and serial I/O.

Options available to expand the system's capabilities, include RAM and programmable read-only memory (Prom) boards to expand memory and a combination memory and I/O expansion board that contains 4K bytes of RAM, capacity for 4K bytes of erasable ROM or RAM, 48 programmable I/O lines and a programmable communications interface with RS-232 compatibility.

The unit is available for $495 for single-unit users and $295 in OEM quantities, Intel said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Pro-Log Says Quantity Discounting Can Save Up to 50% on Its Micros

MONTEREY, Calif. – Pro-Log Corp. has announced quantity pricing for its 4-bit and 8-bit microcomputers, with discounts ranging up to 50% off single-unit prices, the firm said.

The PLS-401A 4-bit system costs $175 for 10 to 24 units and $99 for 500 or more units.

The PLS-4111 costs $195 for 10 to 24 units and $115 for 500 or more units.

The 8611 and the 8111 8-bit systems are offered for $210 for 10 to 24 units and $150 for 500 or more.

Volume prices have also been established for three-card and five-card 6800 and 8080 systems, the firm said. Three-card systems cost $390 for 10 to 24 units and $295 for over 500; five-card systems cost $520 and $390 for the same quantities.

The firm can be reached at 2411 Garden Road, Monterey, Calif. 93940.

Analyzer Debugs 8080 Programs

CHATSWORTH, Calif. – Data Works Instrumentation has introduced the Model 640 Program Analyzer, a program debugging tool for Intel 8080 microprocessor systems.

Programs can be debugged and run in the actual hardware without the use of a computer simulator or other debugging equipment, the firm said.

The Model 640 provides a four-digit display which shows either the program address or data bus contents. Controls are provided for stepping the program from a selectable address, cycling through loops and examining bus contents by instruction step or cycle, according to the vendor.

The analyzer costs $650 from the firm at 9748 Cozycroft Ave., Chatsworth, Calif. 91311.

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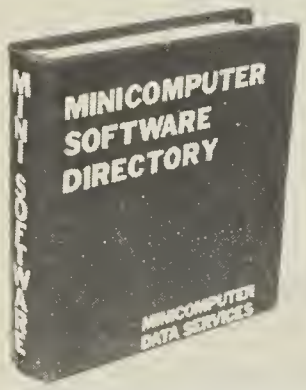

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Labtest Uses Intel 8080 as Basis For CRT-1000 Spectrometer System

LOS ANGELES – The Model CRT-1000 Data Acquisition and Readout System from Labtest Equipment Co. is a microcomputer-controlled spectrometer system.

The system is based on the Intel 8080, an 8-bit parallel microprocessor with a 2 μsec instruction cycle time, 256 input and 256 output ports and address and data buses that allow direct interface to I/O ports and memories, according to Labtest.

Hardware includes 2K programmable read-only memory, 16K random-access memory, 16 analog-to-digital channels, magnetic tape cassette, a CRT and CRT interface and a teletypewriter interface, the firm said.

The basic system costs $11,480 from the firm at 11828 La-Grange Ave., Los Angeles, Calif. 90025.

MOS Technology KIM-1 Handles Teleprinters

NORRISTOWN, Pa. – The KIM-1 microcomputer system from MOS Technology, Inc. includes an 8-bit microprocessor, 2K bytes of read-only memory, 1K bytes of static random-access memory, a 24-station keyboard, six-digit LED display, a clock and interface logic for operation with a teleprinter.

An interface for audio cassette tape units for recording and playback of programs and data is also included. The user may elect to operate the system with either the keyboard and display on the module or from an external teletypewriter.

The system costs $245 from the firm at 950 Rittenhouse Road, Norristown, Pa. 19401.

Turner Has Prom Eraser

MOUNTAIN VIEW, Calif. – Up to 60 erasable programmable read-only memories (Prom) can be erased simultaneously by Turner Designs' Model 30-000, the firm said.

The unit costs $295 from Turner at 2247A Old Middlefield Way, Mountain View, Calif. 94043.

Hitachi Has Prototype Of 16K-Bit NMOS Chip

NEW YORK – A 16K-bit chip with a 200 nsec access time will be available from Hitachi, Ltd. by the end of 1976, a company spokesman said.

The prototype for the NMOS chip has been developed and will be demonstrated in this country this month. The price of the product has not yet been determined, Hitachi said.

Hitachi can be reached through Bell and Stanton, Inc., 909 Third Ave., New York, N.Y. 10022.

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Minis Process Members' Tabs at Two Country Clubs

A country club in Los Angeles and one in Phoenix have found a solution to their accounting problems through the use of in-house small business systems.

A minicomputer at the Bel-Air Country Club in Los Angeles is programmed to add $1 to every member's monthly bill when a golfer hits a hole-in-one.

That way the club brings in enough money to pay for the free drinks for all. And the lucky golfer isn't saddled by an unwieldy bar bill.

The Basic/Four Corp. system keeps tabs on more operations than the holes-in-one, according to General Manager Charles Bernold.

When members use the restaurant, bar, golf or tennis facilities, they usually sign charge-checks rather than paying cash, with the expenses billed to them at the end of the month. Handling these checks, or "tickets," is typically the biggest part of a country club's accounting workload.

"We probably process an average of 550 tickets a day from our club members," Bernold said.

Prior to acquiring the system, the club used an NCR 399 for accounts receivable. "We would use the mini to produce a paper tape from the information on our charge tickets," Bernold explained, "and then we'd send the tape down to a processing center to finish the job and produce our monthly statements.

"While the processing center gave us excellent service, it's much more convenient for us to have control of the whole job ourselves, as we now do."

The changeover to doing the job in-house has not required the hiring of anyone new to run the computer, Bernold noted. "We've actually reduced our accounting staff by 1-1/2 people, while keeping our basic computer cost about the same as before."

Installed about one year ago, Bel-Air's system is a Basic/Four Model 400 including a magnetic disk storage unit, a printer and a video display that serves as an input/output device for the system.

Information taken from the daily charge-checks is fed into the system via this terminal. The printer is used to generate statements, checks and reports.

The system cost the club $40,000, Bernold said.

Besides handling accounts receivable and billing of club members, the minicomputer takes care of accounts payable, payroll for the club's 85 employees and general ledger.

Phoenix Club Changeover

Another country club, in the Phoenix area, is also using the Basic/Four system to process a large number of checks each month.

The club replaced an NCR posting machine with the system.

During the selection process, the club looked at a Honeywell system, a larger NCR machine, Xerox equipment and the IBM System/3, according to Jack Downing, general manager of the Phoenix Country Club.

An accounting firm was hired to do some research on which system to buy, and the Basic/Four system was presented as an alternative, he continued.

The accounts receivable application is the mini's major task at this club, Downing said. The club handles 1,250 members and 173 employees and processes about 47,000 check/mo.

The Model 400 was bought two years ago with about half that volume of checks in mind, Downing said, and the club has since upgraded the system.

Originally installed was a CPU with 8K characters of memory, a CRT and disk drive. An additional 8K of memory, CRT and disk were added, Downing said. Also on the system is a 90 line/min printer.

The system with hardware and programming cost $38,000 initially and $20,000 in upgrades, Downing said. The club estimated it would have had to add three people to the accounting staff without the computer.

Device Links Minis, Printer/Plotters

PALO ALTO, Calif. – Interfaces that are said to allow Varian Statos printer/plotters to be used with minicomputers are available from the firm.

With the interface and software driver, the printer/plotters can hook up to Data General Corp. Novas and Eclipses; Digital Equipment Corp.'s PDP-11 series; Interdata, Inc.'s 70, 80, 7/16 and 8/32 series; Hewlett-Packard's 2100 models; and the Varian V-70, the firm said.

Each interface is supplied with a 20-foot cable, installation manual, software driver manual, hardware, test and diagnostic programs on paper tape and the software driver for the selected operating system.

The device costs $1,275 from the firm at 611 Hansen Way, Palo Alto, Calif. 94303.

Unit Prints 900 Line/Min

WOODLAND HILLS, Calif. – Dataproducts Corp. has an OEM 900 line/min printer for minicomputers.

The Model 2290 is a 136-column printer that prints 900 line/min using a 64-character set or 660 line/min using a 96-character set, the firm said.

The printer costs under $12,500 with quantity discounts available, the firm said from 6219 De Soto Ave., Woodland Hills, Calif. 91364.

Printer Works With Micros

MOUNTAIN VIEW, Calif. – A 160 char./sec line printer designed for use with microcomputers is available from the Binary Corp. here.

Individual units cost $695; in quantities of 100 or more the printer costs $395, the firm said from 2680 Bayshore Frontage Road, Mountain View, Calif. 94040.

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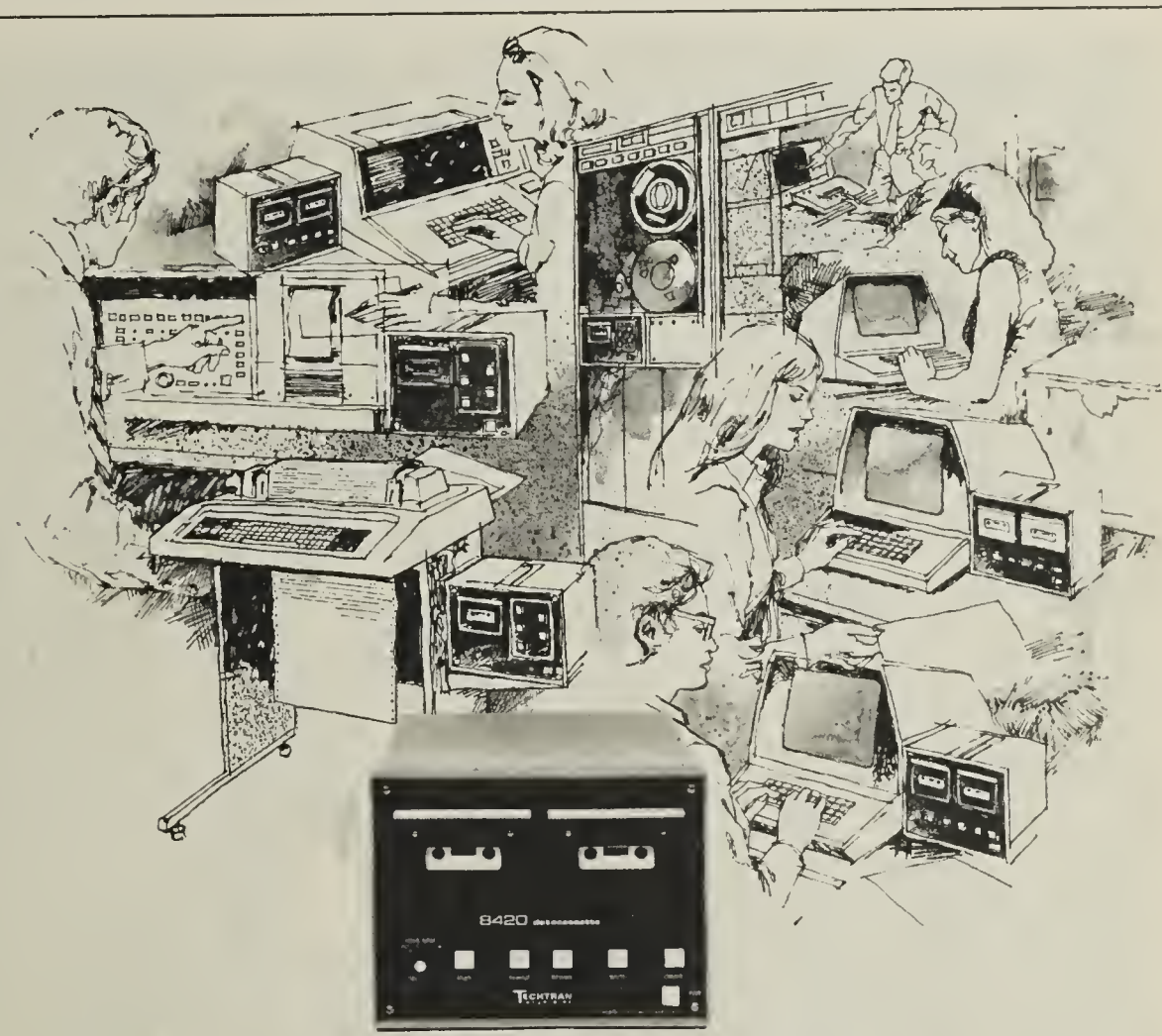

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For Weapons, Ammunition

Minis Play Part in Army, Air Force Ordnance Tests

JERICHO, N.Y. – Dedicated minicomputers are being used for ordnance testing of items ranging from small-caliber ammunition to solid propellant rocket motors.

Military engineers, government contractors and manufacturers of ammunition for sportsmen regularly test weapons and ammunition of every conceivable type for accuracy, pressure and terminal effects. To check accuracy and shot-to-shot dispersion, for example, gunners fire at paper targets and manually compute centroids, standard deviations and extreme variation.

Ten years ago the U.S. Army became aware of the high cost of production obsolescence. In June of 1969, an Army report noted that if modernization of the ammunition production base had been accomplished before 1965, a savings of $312 million could have been realized in small-caliber ammunition alone.

A modernization program began and the Army switched from a batch production technique to a captive production technique wherein a continuous production flow with "captured" components moves at a rate of 1,200 piece/min.

Time for Change

To keep up with this production rate, it was obvious techniques had to change. On-line minis developed by Systems Consultants, Inc. here now allow military engineers to keep tabs on product quality with traceability to specific tooling elements which may be wearing and with a time between ammunition production and test running on the order of 15 minutes, the developer said.

Numerous ballistic ranges have been equipped with the special-purpose systems. These Ballistic Test Submodules provide a fully integrated production test and DP complex allowing for simultaneous testing of different caliber ammunition on multiple firing ranges. Up to 14 ranges can be accommodated on a single CPU I/O bus.

Data concentrators, or Range Control Units, convert sensor data into digital data format, store the data into a local memory and transmit the data accumulated from each round to the CPU.

Mini Does Task

A Hewlett-Packard (HP) 2100 mini with 32K core and Direct Memory Address is used to accomplish the task.

The operator's console is a Beehive II CRT terminal; hard copy is provided via a Versatec LP1150 electrostatic page printer.

The data is subsequently transmitted to a production process quality control system via modem. Should the system be down or unable to accept data, backup is provided via an HP 7970B digital tape unit.

Hard copy of test results is generated in report form. All reports are from a common data base.

Marriage Accomplished

Engineers in the rocket motor field operate under considerable, safety-dictated constraints. For example, the use of electrically active gauges within propellants has been forbidden by safety officers for many years, making the marriage of digital computers to rocket motor propellant charges a difficult task.

Recently, the U.S. Air Force Rocket Propulsion Laboratory accepted a fabricated portable data acquisition system designed to overcome safety objections. This minicomputer-based system, also developed by Systems Consultants, Inc. provides a sequence of events starting with an internal channel-by-channel calibration and ending with a low-voltage, gauge-by-gauge check for opens or shorts before any higher voltages can be supplied to the gauges.

In this application, the minicomputer not only manages the flow of data – including the usual functions of checking limits and triggering alarms – but also controls application of all gauge voltages to prevent inadvertent application of high voltage to a low-voltage gauge.

The system is configured in eight aluminum transit cases and has a gross weight of 2,000 lbs. Sixty-four AC channels and 70 DC channels of data can be acquired. Correlation between temperature channels and other channels allow real-time temperature compensation of gauges.

Timing Scheme

An analog tape recorder can be turned on and off under either a predetermined timing scheme or by data excursion. Combined AC/DC data is separated into AC and DC components, allowing for low-amplitude AC limit checking in spite of high-amplitude DC.

A provided digital tape recorder can be used in conjunction with an internal A/D running at 20 kHz. A channel may be plugged into one of six peak detectors. An on-line printer and keyboard allow real-time program alteration and report generation.

The major hardware elements are an HP 2100 CPU, an HP 7970 digital tape recorder and a Bell and Howell 14-track analog tape recorder and a Centronix dot matrix printer.

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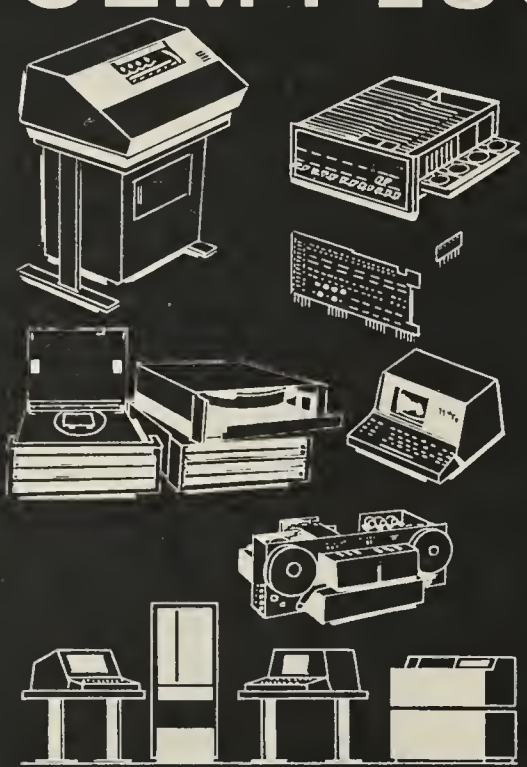

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Bank System Handles Back-Office Tasks

NEW YORK – Datasaab Systems, Inc. has a minicomputer for back-office and administrative banking procedures.

The D5 system can edit and forward newly opened checking, savings and various club accounts from remote locations, the firm said.

The system handles "stop payment" orders and inquiries in real-time from the branches to the main computer.

A minicomputer with 32K bytes of memory, five CRT stations, tape cassette, power supplies, adapters and application software costs $50,000, a company spokesman said from 432 Madison Ave., New York, N.Y. 10022.

Insurance Firm's System Cuts Plan Revision Costs

By Robert G. Stone
Special to Computerworld

SPRINGFIELD, Mass. – Mass. Mutual Life Insurance Co. here decided to go to a mini-based word-processing system when a cost analysis showed this would enable us to reissue 1,100 pension plans at a one-half to two-thirds savings. We found this same shared-logic system could also produce all the different documents required to accompany each revised pension plan (contract, initial proposal plan, etc.) and should have a significant impact on reducing the cost of new business as well.

In early 1973, we knew we had problems. We had a manual typing group of 22 full-time typists and a night group of four handling overflow. They were producing over 3 million lines of type or about 75,000 documents per year.

Clerical costs were rising, productivity levels were static and demands for documents were increasing every day.

Mass. Mutual maintains a Standards and Research Department to keep abreast of new methods and equipment. It provided assistance by making us aware of the various vendors and their equipment, and, by June of 1973, the Group Division had begun to investigate both stand-alone magnetic card and magnetic tape units and shared-logic systems.

Shared-Logic System Chosen

Our cost analysis showed, on a one-to-one basis, that no system we considered compared with shared logic. For example, on a one-to-one conversion basis, a 50% staff reduction could be accomplished with a shared-logic system, and far less than this would be the result with stand-alone devices.

Shared logic was twice as fast on transcription, nearly three times as fast on long-document preparation and, with individualized form letters, four times as fast as stand-alone units.

Up to 12 typists have simultaneous access to a range of word-processing functions and up to 8,000 pages of on-line stored text.

Once we established that a shared-logic system was the only way to go, we approached LCS Corp.

The firm put together a formal proposal for equipment which would meet our present needs and yet be expandable into the future. It included a Digital Equipment Corp. minicomputer, four disk storage units, eight IBM Selectric typing stations, two video typing stations and one high-speed printer.

Major Change for Staff

We knew we did not have to hire new staff simply because we had new equipment. The LCS system requires no special skills beyond ordinary typing. But we recognized that the transition from a manual to an automated environment was a major change for our staff.

We began the transition by holding regular meetings with all the typists, which kept everyone up to date on the various systems we were considering.

As we got closer to the final decision, we brought in photographs and literature on the LCS system. And, during the actual installation, our typists were given free time to watch the work and ask questions.

On our first day of operation in April 1974, two trainers from LCS arrived and went to work with four of our typists on the basics of the Compu-Text system.

By the end of the day, our people were functioning with the system on their own. They were able to access a particular program, input corrections using the editing feature of the system and generate finished work.

Another important aspect of the changeover period was the absolute necessity of maintaining our production schedule, particularly in generating new business materials. Time loss here could have been critical.

Because of the groundwork we did with the staff and the ease with which they were able to learn the LCS Compu-Text system, work schedules were maintained, with only very minor delays, and these lasted only a very short time.

Material is keyboarded at rough-draft speeds. Errors are corrected by backspacing and typing over the unwanted words. The copy is entered into the system, with the errors automatically corrected. Formatting is done automatically by the system.

Where standard paragraphs are used, the secretary types in the identifying codes. The system responds by literally asking for the variables where indicated.

The secretary is led through the procedure, inserting information where designated by the system and the author.

It is not necessary to play out a document to insert the variables as on the magnetic tape or card typewriter. In fact, with our system, if a variable is in the document several times, the system will automatically insert it. In addition, as the various standard paragraphs are combined, they are automatically numbered in proper sequence. If in the editing process a new paragraph is added, all other paragraphs and sections in the document will automatically be renumbered, saving many hours of editing which would be required on a magnetic automatic typewriter.

When work is on-line, the magnetic disk is in one of the system's five active disk storage units, and information can be retrieved on command.

Off-line jobs are on disks that have to be physically mounted onto a storage unit to be retrieved. Each disk can hold up to 1,000 pages of text.

Another important factor is the cost of storage. A disk costs only $99. The equivalent cost of 1,000 pages on magnetic cards would be approximately $1,000.

Stone is assistant director for group administration at Mass. Mutual.

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MCS Introduces Disk Systems For DG Machines

SANTA CLARA, Calif. – Microcomputer Systems Corp. (MCS) has disk systems that interface to Data General Corp. Nova and Eclipse computers using a microprogrammed controller.

Systems can be configured to provide 4,800M bytes on a single controller, multiported to four computers, MCS said.

Standard features include overlap seek, fail-safe features such as write protect to the sector level, defective track sensing/flagging and error-recovery command processing.

Optional features include extended error correction, drive power sequencing, multi-CPU port and extended maintenance diagnostics.

Price for a 40M-byte system is $17,500. An 80M-byte system sells for $19,500 from the firm at 3068 Kenneth St., Santa Clara, Calif. 95050.

DAC Has S/3 Model 15 Printer

STAMFORD, Conn. – Digital Associates Corp. (DAC) has what it said is the only non-IBM printer system for the IBM System/3 Model 15 available in this country.

The DAC/3 Model 750 printer includes the firm's chaintrain feature, which consists of character links that ride on a monorail track, a spokesman said.

The 750 line/min, 132-column printer has a sound-deadening cabinet and static eliminator, single-line memory and a paper slew rate of 20 in./sec, he added.

The printer costs $545/mo on a three-year lease with a $115/mo maintenance charge or purchased for $22,995.

IBM's 600 line/min printer, the fastest available from that firm for the System/3 Model 15, costs $706/mo on a 24-month lease with a $204/mo maintenance charge and costs $31,410 when purchased.

AIIE Plans Conference Next Month On Applications, 'Lessons Learned'

SAN FRANCISCO – A conference on minicomputer applications in government, business and other organizations will be held by the American Institute of Industrial Engineers (AIIE) here March 22-24.

The conference was designed to promote effective minicomputer applications by attendees, AIIE said. Successful application experience and "lessons learned" by users will be presented.

Scheduled workshops include sessions on minis as an approach to decentralized data processing for the large user or as total service for the smaller user; minicomputers on-line to a CPU as an approach to distributed data processing; and intelligent terminals and minicomputers for data-handling applications.

Other workshops will discuss minicomputer networks.

The conference will cost $265 for members and $295 for nonmembers, a spokeswoman said. Information is available from Department PR, AIIE Seminars, P.O. Box 25116, Los Angeles, Calif. 90025.

Adage Links GP/400 Line to Novas

BOSTON – Adage, Inc. has incorporated a Data General Corp. Nova interface into its GP/400 Graphics Peripheral product line.

The interface comes in two models. The HCI640 permits image refreshing from the memory of the Nova via the Nova's Direct Memory Address channel.

The HCI641 uses a local refresh buffer for image refreshing. Buffer sizes range from 4K to 32K 16-bit words.

The HCI641 places the image refreshing task outside the mini's memory, freeing the memory for the application program, Adage said.

The interfaces are included with the GP/400, which sells for about $45,000, an Adage spokesman said from 1079 Commonwealth Ave., Boston, Mass. 02215.

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INTERDATA

Interdata Inc. will display its 16- and 32-bit computers and Carousel printer terminal - high reliability products with performance, packaging and pricing designed to provide sophisticated OEMs and end users with the most cost-effective tools available for their computing needs.

WANG LABORATORIES, INC.

The Wang Data Center provides a full range of data processing services from its IBM 370/158 OS/VS-2 service bureau. Applications such as INFOREM (inventory forecasting), Human Resource Management, Letter Writing, and CROSS-TABS (statistical analysis) systems will be displayed at the Caravan.

BASF

BASF SYSTEMS will display a full line of magnetic media for data processing applications: Data Modules, Disk Packs, Disk Cartridges, Flexydisks, Digital Cassettes and Computer Tape. BASF SYSTEMS, a Division of BASF Wyandotte Corp., is based in Bedford, Mass.

COOKE ENGINEERING COMPANY

Cooke Engineering Company will display the very latest available Tech Control equipment.

All of the requirements of a modern data communications Tech Control Center may be satisfied by selecting off-the-shelf modules for patching, switching, monitoring and interface testing.

COMPUTER INDUSTRY

CI Notes

Data General Proposes To Acquire Incoterm

SOUTHBORO, Mass. – Data General Corp. (DG) here has agreed in principle to acquire neighboring Incoterm, Inc. for an exchange of stock valued at $38 million.

The proposed acquisition is subject to approval by each company's boards and by Incoterm shareholders. The terms of the agreement have not been divulged, and company officials would not indicate whether Incoterm will operate as a subsidiary.

DG makes minicomputers and assorted peripherals while Incoterm makes intelligent terminals that include its own processors.

Jean N. Tariot, president of Incoterm, said the agreement should be viewed as two companies in complementary business areas seeing a combined opportunity for both.

The move should give Incoterm a potentially broader range of technology in some of its work, Tariot said. DG's processors are in a higher range than Incoterm's, he added.

HIS Orders CDC Tape Drives

MINNEAPOLIS – Control Data Corp. has received an OEM contract from Honeywell Information Systems, Inc. (HIS) to supply it with numerous models of tape drives, including those with 6,250 bit/in.

The value of the five-year contract could reach $60 million, CDC officials said.

First deliveries are scheduled during the third quarter this year.

NCR Checks In on Checkout Units

DAYTON, Ohio – NCR Corp. currently has installed point-of-sale (POS) computerized checkout systems in 1,200 supermarkets, seven of which also have scanning capabilities in operation.

There are 12,000 POS terminals installed, the company said.

Ralph E. Canada, NCR's manager of Food and Drug Systems, noted that in recent months NCR has been converting an average of two supermarkets a day.

"We believe this pace of implementation will accelerate even faster in 1976," Canada said.

Learson Named Ambassador

ARMONK, N.Y. – Retired chairman and former member of the IBM board of directors T. Vincent Learson has been named ambassador at large and special representative of the President for the Law of the Sea Conference.

Services Link CCC, DP

'Think of CDC as One Company': Norris

By Molly Upton
Of the CW Staff

LOS ANGELES – Control Data Corp. is taking steps to blend the operations and earnings power of its computer operations and its Commercial Credit Co. (CCC) subsidiary, according to William C. Norris, the company's chairman.

CDC's 1976 budget shows a "reasonable increase in earnings over 1975," Norris said, citing momentum gained from progress made in 1975.

However, first-quarter results are expected to be below those for the 1975 period, he added.

In a speech filled with clues on CDC's future plans, Norris told financial analysts here the firm's earnings in the years ahead should be viewed more as those of one company rather than considering CDC as a computer company and CCC as a finance company.

The key to the one-company philosophy is CCC's "integrated services strategy," which calls for increased use of CDC's network capabilities in offering specialized services, he said. These include computer-based education (CBE) for use by firms in training employees and Technotec, a service that provides the means for a worldwide exchange of technology, he added.

CCC Selling CBE

CCC has assumed responsibility for selling CBE services to both individuals and industry, Norris said, and announcement of the program will be made in April.

The integrated services strategy "recognizes that CCC's marketing strengths with consumers and small businesses can be expanded profitably by combining them with other services based on CDC's computing strengths," he said.

CCC is "pursuing several new offerings that we think promise exciting growth opportunities with little additional risk," Norris commented.

The elements of the firm's business that will play key roles in CDC's services strategy are computer systems, peripherals and financial services, he said.

The installation of a CDC 7600 system in its Cybernet service is providing a "distinct market advantage that is achieving immediate success," Norris said.

No other commercially available data service, he said, has a machine with the 7600's power and computing efficiency.

In a recent test the 7600 executed a program in 61 seconds; a user's IBM 370/158 took 55 minutes, Norris said.

CDC is also installing its largest computer, the Star, in Cybernet. "In the area of peripherals, industry-oriented terminals are important, particularly for our CBE service offerings," he commented.

Role of Data Services

The firm's reader/sorter equipment is an "essential part of our banking data service." Norris added data services will soon need other products, such as its mass memory and electron beam memories under development.

"The role of financial services . . . is greatly expanded by the launching of

(Continued on Page 60)

Consultants See Minicomputers As Philosophy, Not as Definition

By Molly Upton
Of the CW Staff

Just as vendors of minicomputers were loathe to dream up succinct definitions that bound their products by architecture constraints [CW, Jan. 12, 19], industry research organizations have also adopted somewhat elastic, conceptual definitions of "minicomputers."

And nearly all implicitly or explicitly excluded IBM from the ranks of minicomputer makers.

Auerbach Publishers, Inc. believes the mini is the product of a philosophy of selling the user what he needs to solve his problem, according to Jean Bartik, project editor of reports on minicomputers.

This is in distinct contrast, with the approach of mainframers, who attempt to sell users what they have in their product lines, she added.

This philosophical approach has become necessary to set the mini makers apart from the mainframers, many of who are selling machines that would qualify as minis in terms of price and configurations, but whose philosophies do not jibe with that of the mini makers, she said.

"The minicomputer makers actually got a toehold in the industry because they only gave people what they needed while the mainframers were trying to jam what they had to sell down users' throats," she said.

OEM has always been very important to the minis, and the activity in this area has really picked up with the latest announcements, she said.

Glenn E. Dawson, president of Alltech Publishing Co., also took a philosophical approach toward a definition, saying "a definition has to be independent of technology."

He definied a minicomputer conceptually as a lower cost system that is placed at different points of computing

(Continued on Page 62)

Third-Party Buying Saves U.S. $27.8 Million in Three Years

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The Federal government has saved an estimated $27.8 million since its Third-Party Replacement Program began three years ago, and the General Services Administration (GSA) is taking steps to further decrease government dependence on mainframe makers for equipment, according to Theodore Puckorius.

The GSA commissioner for automated and telecommunications services recently told members of the Computer Dealers Association the leaseback concept is probably the most important means computer brokers, which are often capital-shy, have for doing business with the federal government.

GSA officals believe it is within their authority to advertise to the financial community seeking funding support for leaseback arrangements at the best interest rate available, he said.

"We have asked the General Accounting Office to rule on our authority and are hopeful it will concur," Puckorius said.

Other means of increasing available funds in order to increase the acquisitions from third parties include multiyear lease authority as well as loosening of the Automated Data Processing Fund spending ceilings by the Office of Management and Budget, he said.

Under the Third-Party Replacement Program, 111 contracts totaling $117.4 million have been awarded to third-party dealers for computer systems, Puckorius said.

While $117.4 million might not sound like very much in terms of the $3.9 billion spent by the Federal government on DP activities annually, "only about $700 million is spent on hardware," he observed.

(Continued on Page 61)

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CDC-NCR Venture Progressing

LOS ANGELES – Control Data Corp.'s cooperative program with NCR Corp. to develop a common line of mainframes has "moved beyond the design phase into product development," William C. Norris, CCD chairman, told financial analysts here recently.

NCR has responsibility for developing and manufacturing the medium- to small-sized computers and CDC the larger models. Most of the cost of systems software is being shared, Norris said.

CDC began cooperative programs about 12 years ago and now is involved in this type of program in virtually every major area of technology important to its business.

It is a partner with Honeywell, Inc. in Magnetic Peripherals, Inc. and with NCR and International Computers Ltd. (ICL) in Computer Peripherals, Inc. The latter produced CDC's mass storage system, an on-line tape library.

Norris called the mass storage system's sales potential "exciting" because it reaches "fully into the OEM and end-user markets as well as with our own computers and in data services installations."

CDC also is conducting activities on a project basis, including a bank reader/sorter data entry system with Honeywell. Its Cyberdata data entry equipment came from a joint venture in Israel, he commented.

CDC also has a jointly owned company in Europe with Plessey, Nixdorf and ICL.

It is the major partner in Microbit Co.

Software for CDC's Plato computer-based education system came from a cooperative effort with the University of Illinois, he said.

DP Arm, Subsidiary Interacting More in Services Area: Norris

(Continued from Page 59)

CCC's integrated services marketing," he said.

Data services developed by the computer business along "with other CCC services when packaged with CCC's traditional financial and insurance offerings will be more responsive to business and consumer needs," Norris said.

Norris explained the "integrated services program is aggressive but does not contain a high degree of risk or unduly burdensome costs."

The computer business, for example, has already absorbed the development costs and startup losses of CBE and the capital investment for the computer services network has already been made.

"The necessary worldwide computer service will be furnished by Cybernet. This additional usage will increase the economies of scale of Cybernet which will, of course, be beneficial to both CCC and the computer services business," he said.

In reviewing profitability, Norris said "the mature data services produce a higher return on investment than any of our product businesses."

The mature data services of Service Bureau Co., Cybernet Services and American Research Bureau "grew substantially in 1975 and should continue to grow at a 12% to 20% rate with continuing attractive profitability," he added.

There is also less risk in the data services area since the major part of the worldwide network is in place, he observed.

Norris listed a number of services in the developmental stage and areas of expansion, adding these required continuing investment in 1975 and many are still in a startup loss position.

However, steady improvement in profitability is expected from the services, which include Compunet, Ticketron, Action Data, Cyberloan, brokerage, banking and utilities services and Star Data Services.

'Significant' Progress

Reviewing CDC's "significant" progress in computer systems in 1975, Norris said there were 28 deliveries of models in the Cyber 170 line.

The firm has been developing industry applications, including those in the utilities, petrochemical and manufacturing areas as well as CBE.

"These and other application areas plus expansion and upgrading in our established customer base of general engineering and scientific users should provide adequate sales opportunities for our large computers," he said.

CDC's peripherals business is in a stronger position than it was a year ago, he said, citing evidence of profitability designed into the firm's mass storage system, terminal and data entry products announced in 1975.

Business products, or supplies, are seeing a "healthy upturn" in 1976 compared with a declining demand a year ago.

One of CDC's weakest areas in 1975 was OEM sales of peripherals, which has begun to strengthen, particularly in the U.S., he said, pointing to the contract with Honeywell.

Norris said that with cooperative ventures in product development and CDC's internal programs, CDC "has available the resources to keep abreast of or ahead of technology without undue burden."

Internal R&D programs of the most significance include those in communications networks, graphics, advancement of Star technology, terminal displays and CBE, he said.

Turning to the financial aspects, Norris said during 1975 the firm reduced total debt for the year by about $84 million, and outside borrowing was down by about $76 million.

Administrative expenses as a percent of revenue have been reduced in all parts of the computer business and overall marketing and administrative expenses also are declining as a percent of revenue, he said.

On a corporate basis, revenue per employee increased from $29,000 in 1974 to $36,000 in 1975.

In the systems business, manufacturing and marketing costs are coming down because "market areas and products are now well enough defined that we can standardize and evolve designs" in contrast with new market entries, such as peripherals.

CCC's marketing efficiency will improve with integrated services and employee productivity will be helped by Cyberloan, he said.

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Knowledge of RFPs Give Dealers Edge

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – While there are a number of procedures the Federal government can use to purchase equipment, about 90% of all DP equipment is procured with the request for proposal (RFP), Terry Miller told a seminar sponsored by the Computer Dealers Association here recently.

Miller, president of Government Sales, Inc., said the dealer who understands this purchasing system can be successful in dealing with government agencies.

The reason for the RFP's popularity is that it allows the buying agency to negotiate further with individual companies after receiving their initial offers, he said.

No Limitation

Interestingly enough, there is no limitation on the number of proposals a company may submit in response to an RFP, Miller pointed out.

Partial proposals which the government may consider "nonresponsive" often will be considered, especially in the case of an RFP for used equipment. But it is important to note that such a "nonresponsive" bid will never be accepted without the government's first amending and reissuing the RFP so all bidders can benefit from a revision in the specifications, he said.

If the government's RFP calls for an IBM 360/50 system for installation on May 1 and a dealer doesn't have one that can be installed on May 1 but could get one by May 10, he can submit a bid specifying a change in the date.

If the dealer's change is considered by the government to be substantial and it wishes to consider the dealer's proposal, it must amend the RFP and release it again to give all bidders another chance.

In such a case the dealer could win a contract he would have lost if he had taken the RFP at face value. However, Miller cautioned, there's always a chance the government's requirements are firm and the "nonresponsive" bid will be thrown out.

Once the bids are in, the government must make sure the bidders it is considering are "responsible" – that they can deliver the goods they bid on and are stable financially, Miller explained.

To do this, it may inspect a used dealer's equipment or request serial numbers of the gear being offered. Failure to satisfy the government on this point normally means a bidder will not win even if his bid is the lowest, he said. Only offers from dealers who pass this test are compared to obtain the best possible price, terms and guarantees, he said.

'Best and Final' Bids

Following opening of the bids, in which all prices and terms are kept secret, the government conducts negotiations – either by phone or in person.

Finally, the government can call for a "best and final" offer, giving the dealer one final chance to correct, change or "sharpen his pencil," Miller said.

In some cases an agency will not ask for a "best and final" bid unless important changes have been made in the delivery date or quantities originally requested, so during negotiations the dealer should always ascertain whether a "best and final" offer will be requested.

If prices or terms are leaked when bids on an RFP are being considered, the rules are being violated, with possible civil and criminal penalties for federal employees convicted of such practices, he noted.

A dealer may withdraw an RFP at any time and change it as often as necessary up to the "best and final" bid, Miller said.

Mailing Lists a Dealer Resource

By a CW Staff Writer

WASHINGTON, D.C. – DP suppliers interested in doing business with the Federal government can become experts on the government market by familiarizing themselves with a few regulations and getting on the right mailing lists, according to Terry Miller, president of Government Sales Consultants, Inc. here.

Since any agency wishing to purchase an item valued at more than $10,000 must publish its intentions in the *Commerce Business Daily*, available from the Department of Commerce for $75/year, that is the DP supplier's first source, he noted.

Secondly, since about 80% of all DP equipment used in the government is purchased by the General Services Administration and the departments of the Army, Navy and the Air Force, Miller urged suppliers to get on those agencies' mailing lists.

Few Agencies

The remaining 20% is bought by only a few agencies, according to Miller. The more sophisticated agencies such as the Energy Research and Development Administration, the National Aeronautics and Space Administration and the Department of Transportation will produce the bulk of the business, he said.

Finally, by reading categories 70, 74 and W of the *Commerce Business Daily* every day, suppliers can identify "most of the business out there," he said.

Third Parties Save U.S. Millions

(Continued from Page 59)

The savings of $27.8 million is realized by comparison with prices that would have been charged by equipment manufacturers.

Another program aimed at reducing dependence on mainframe manufacturers is the GSA's third-party maintenance solicitation currently under industry review, Puckorius noted.

The draft document was sent to about 200 companies and GSA has received a number of responses, including position papers from the Computer and Business Equipment Manufacturers Association and National Council of Technical Services Industries, he said.

Two 'Glitches'

Puckorius cited two "glitches" in the relationship between the third-party dealers and the government – first, the mandatory requirements contract and, secondly, the problem of insufficient inventory.

The mandatory requirements contract, established by Congress as part of the Brooks Bill, enables the government to receive discounts in exchange for quantity purchases.

Today, however, some equipment under such contracts is often available from third parties at cheaper prices than those negotiated under the mandatory requirements contracts, he said.

Nevertheless, agencies wishing to obtain items covered by such contracts still must buy under the mandatory contract for the duration of the agreement.

These contracts often leave dealers with an unmarketable system "spare piece" following installation of a system in a government agency, Puckorius noted.

As for inventory, Puckorius said often dealers simply don't have the equipment in their inventory which the government needs.

While his talk was seen by industry observers as positively oriented, Puckorius did remind dealers his prime obligation is to promote the interests of the government, not to protect small industry.

"What you can and should expect from us is a fair opportunity to compete – nothing more or less," he said.

GSA must take criticism from the large mainframers who claim they must spend big money on competitive system bids and benchmarks and then find they are beaten out by dealers who want to move in with a discount machine and no marketing costs – after the mainframers have paid the fiddler, he explained.

In addition, Puckorius said he would be emphasizing requests for proposals based on system objectives or performance specifications – which he considers more competitive.

The dealers are more equipped to compete in cases where a specific make and model is requested, he said.

Regardless of this fact, there should continue to be good opportunities for government business for dealers because the government is as eager for the dealers to replace its leased systems as the dealers are to do it, Puckorius concluded.

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Not a Definition

Minis Seen as a Philosophy

(Continued from Page 59)

needs within an organization. In those cases where the mini is the dominant central computer, it is at a very much reduced cost, he added.

Dawson said he was dismayed by some mini makers' efforts to cease billing their products as minis. Once they crawl out from under the umbrella afforded them by the minicomputer concept, they discard the protection of being an alternative to IBM and become a competitor.

They then face the possibility of countermoves by IBM, he said.

"You've got to be where you can be autonomous, where IBM can't define you out of the industry," he remarked.

Also, he said, users would be more likely to buy a machine from a mini maker that was billed as a minicomputer, regardless of its capabilities, than they would the same machine billed as a head-to-head competitor with, an IBM 370, for example.

For one reason, "it's credible that the system costs less and people will buy it" if it's sold as a mini, he said.

IBM, he said, will not enter the mini arena, where vendors are totally unbundled and sell components separately.

OEM Crucial

International Data Corp.'s (IDC) definition excludes IBM from the market by virtue of the requirement that minis be in the OEM business, according to Jim Peacock, editor of *EDP Industry Report*.

"The IDC definition's orientation is more marketing than technical" since "to specify word size, memory capacity or price in such a dynamic market has become an exercise in futility," according to an IDC study on "The Minicomputer/Miniperipheral Market."

"Minis are general-purpose by design and sold as tools, not just solutions." This definition excludes process control systems, communications processors, key-to-disk systems or dedicated small business computers, the study observed.

In addition, minis are available as complete systems or as boards with OEM discounts and are generally sold, the study indicated.

The "pseudostructure" within the minicomputer market includes traditional minis, superminis and microminis, IDC said.

Traditional minis have price tags generally in the $2,000 to $25,000 range, with 8-, 12- and 16-bit words and 4K to 64K words of memory, according to the study.

Superminis are generally more expensive and have a word size of 16 bits or more, memory cycle time of 1 μsec or less and an internal memory size of at least 64K words. Software includes an assembler, an operating system and at least one high-level language compiler.

Microminis are based on LSI technology and are generally available for less than $1,000, can have less than 4K internal memory and are limited more by the processor speed than memory speed, IDC said.

"Precise definitions of these finer class distinctions are even more elusive than that of minicomputers themselves, and IDC submits that microminis are primarily a marketing vehicle to highlight the latest technological breakthroughs and price drops rather than a distinctly different product concept," the IDC study said.

Purpose, Price Important

At Datapro Research Corp., Dale Kredatus, technical consultant, said he sees the firm's definition holding true for the next couple of years.

Datapro applies the term "mini" to those computers suitable for general-purpose applications and priced under $50,000 in their minimum configurations.

Peripherals Decreasing

Although CPU and memory prices are going down, peripheral prices are decreasing as rapidly. He cited the vision of the salesman coming through the door with the CPU in a couple of attache cases, followed closely by a tractor trailer of peripherals.

Datapro defines a "typical mini" as a parallel, binary processor with a 16-bit word length that uses integrated circuits, is housed in a compact cabinet and requires no special air conditioning.

It offers 4K to 32K of core or semiconductor storage with a cycle time of .8- to 1.5 μsec. Parity checking and storage protection are available as extra cost options.

Terminals Get Timely NYSE Data

NEW YORK – January was a record-breaking month for the trading volume on the New York Stock Exchange (NYSE), which meant a strain on certain Big Board facilities. Implementation of a higher speed transmission line enabled desktop quotation-retrieval terminals to obtain timely information.

The Big Board's ticker tape ran late on several days, with delays of up to 30 minutes on Jan. 19 when the trading volume was a record 38.45 million shares, topping the previous record of 35.16 million shares on Feb. 13, 1975.

As a "partial remedy," on Jan. 12 ticker data was made available to vendors of desktop quotation-retrieval terminals using 2,400 bit/sec transmission lines from the Securities Industry Automation Corp.

This enabled desktop units to show up-to-date trading data. Previously the transmission to vendors' data bases was at 135 bit/sec, the same speed as the ticker tape itself, a spokesman from Quotron Systems, a vendor of desktop units, said.

The Big Board has taken some other steps to remedy the lateness, and these seem to be working. With volumes close to that on the day the tape was 30 minutes late, the tape was only about 1.5 minutes late, he said.

These steps included instituting the "volume-delete mode" on the ticker system. In this mode, the last price in effect for a commodity is displayed, but the volume of shares traded is not displayed, so one doesn't see the total size of the trading action.

The desktop quotation systems, however, have all the information available, thanks to the high-speed lines, the spokesman said.

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Has Higher Purchase/Lease Ratio

Winchester-Compatible Disk Unit Mart Called Unique

By Molly Upton
Of the CW Staff

BEDFORD, Mass. The market for IBM 3348 Winchester-compatible disk modules has some individual characteristics, including a higher than normal purchase-to-lease ratio, according to Robert M. Siggelkoe, computer group product and planning manager at BASF Systems.

Since the head is enclosed in the module, the role of the 3348-type module supplier increased beyond that of the traditional pack supplier, he said.

He likened BASF's role to that of a plug-compatible supplier, since its modules interface with IBM software, he said.

This situation is "frustrating but interesting," Siggelkoe commented.

"We're getting into a lot of new areas," he added. For instance, users have trouble distinguishing whether the problem is in the module or in their software, he said.

One problem BASF encountered was that a ditto program wouldn't work unless another job was first run on the system. "We were getting packs returned," Siggelkoe said. This was eliminated by a program temporary fix (PTF) from IBM.

Another Problem

Another problem BASF encountered was on a customer's System 3/15, which wouldn't initilize. It found the user had to turn off a simulation area at the console before he could initialize. Then he could go back to simulation, Siggelkoe said.

Before, "there was no necessity for us to know programming. Now we sort of have to, and it's a new world."

But the market is "beautiful, well worth the effort," he said.

Siggelkoe explained that previously when users were dealing solely with IBM, the chances were good their customer engineers knew of idiosyncracies in the new software releases and how to circumvent these before the patches were put out by IBM.

Now BASF is finding it needs to go more into the software area.

One benefit, is that when BASF solves a problem for a customer, the user becomes very loyal to BASF, Siggelkoe said.

In addition, BASF has been able to refer customers with similar IBM equipment to each other to provide additional advice on handling their equipment.

IBM's corporate stance toward working with BASF has been very cooperative, he said.

Siggelkoe surmised that one reason a higher percentage of users is buying Winchester-type modules than normally buy other types of packs is that users believe the technology will be around for a while. Also, there is not as much wear on the drive, he added.

BASF has installed almost 2,000 modules in the U.S., he said.

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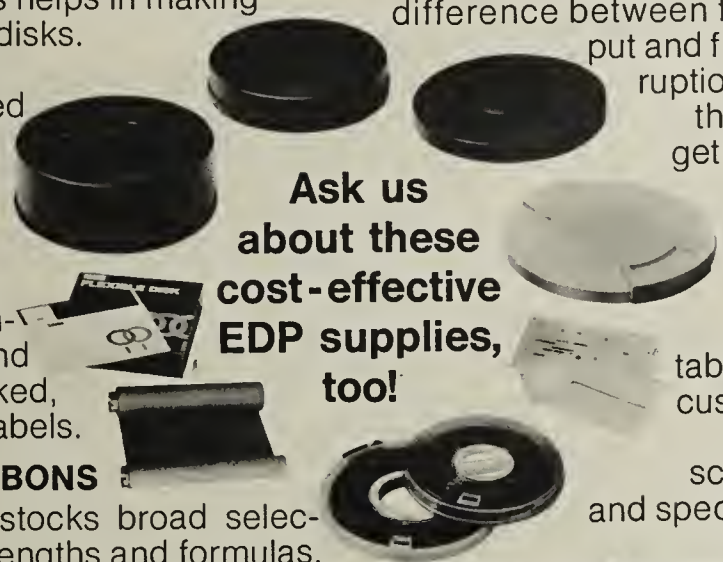

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CW-2236

Standard Approved For Format, Contents Of Data on Shipments

WASHINGTON, D.C. – The National Industrial Traffic League has approved the American Trucking Associations' (ATA) Shipment Status Reporting Standard (SSRS) to promote more effective use of computers and data communications between shippers and motor carriers.

SSRS provides guidelines for the format and contents of shipment status inquiry messages from shippers and answers from carriers.

The standard is based on the use of numbers which identify shipments in shipper and carrier data systems. The number assigned to a shipment will be the shipper's bill-of-lading number, limited to 12 characters, the ATA said.

That number will be cross-referenced to the freight bill or other movement control number by motor carriers.

"Without a standard to guide both the carriers and shippers wishing to participate in electronic data exchange, a shipper who seeks tracing information by computerized procedure might have a room full of different data communications terminals each linked to a different motor carrier," Gerald C.R. Wheatley, chairman of the SSRS Task Group, said.

Firm Founded to Specialize In Two Types of DP Leases

WHITE PLAINS, N.Y. – Barry P. Korn has founded Barrett Capital & Leasing Corp., which will specialize in two types of computer equipment leases.

The firm will act as a direct lessor of both large mainframes as well as peripherals, minicomputers and small mainframes, usually valued under $100,000, Korn said.

These non-tax-oriented transactions will be with either used equipment or instances where the investment tax credit is claimed by the lessee, he said.

Barrett will also handle large systems on leveraged leases, in which Korn will serve as packager and underwriter and structure the transaction, he said.

Korn was previously secretary and treasurer of DPF, Inc., a computer leasing firm.

Barrett is at 14 Redwood Road, White Plains, N.Y. 10605.

CIA Has Book on IBM

ROSSLYN, Va. – Copies of Rex Malik's account of the inner workings of IBM, *And Tomorrow the World?*, are available from the Computer Industry Association (CIA) here for $15.

The 496-page book, published by Millington Press, is said to be based on internal IBM documents and senior management committee minutes as well as other sources.

Malik is a veteran industrial correspondent for several publications both in Europe and the U.S.

The CIA is at 1911 N. Fort Meyer Drive, Suite 801, Rosslyn, Va. 22209.

Italian Mini Mart to Grow Annual 30%

WASHINGTON, D.C. – Minicomputer sales in Italy are expected to grow an average of 30% annually and reach $3.3 million by 1977, according to a study by the U.S. Department of Commerce.

The present trend favors nonbusiness minicomputers, Commerce said. Those machines used as front-end processors will be in demand by manufacturing and industrial sectors of Italy's economy.

Commercial banks are seeking minis for applications related to real-time deposit accounts and stock exchange information services, the U.S. study said.

The Italian market for U.S. DP exports is expected to grow as much as 20% annually through 1977, with the total market reaching about $565 million by 1977 compared with $450 million in 1974, according to the report.

The growth rate for terminals and peripherals is also expected to be high, the study said. Purchases of independently sold peripherals should approach $55 million for the period 1973-77.

Sales of separately purchased peripheral equipment are expected to surge to $16.9 million by 1977, a 276% increase over the 1972 level of $4.5 million, Commerce said.

Sales of data transmission equipment, which totaled $15.1 million in 1972, should nearly triple by 1977, reaching $44 million.

By 1985, most end users will be trying to upgrade their systems, providing U.S. suppliers of technologically advanced systems an additional edge in the competition, Commerce said.

While punched card systems still dominate the market, many users are switching to card-to-tape and key-to-disk systems because of their speeds.

There is also a demand for optical character recognition (OCR) and computer output-microfilm (COM) equipment along with off-line printers, the report said.

Italian buyers are expected to turn increasingly to the use of point-of-sale (POS) equipment.

At present, the market for guidance in the selection of computer facilities and for training personnel, supplied independently of the major computer firms, amounts to over $10 million and is also expected to increase, the Commerce report said.

International News

Government Allowances Seen Increasing DP Sales in Australia

SYDNEY, Australia – DP equipment ordered before June 30, 1978, for installation within one year will attract an investment allowance of 40% under a new government scheme here.

Coupled with a doubled depreciation rate, this will give Australian DP sales a decided boost, according to *Computer Weekly*.

The investment allowance means that companies, when preparing annual tax returns, will be able to include an amount equal to 40% of the cost of the purchased equipment as part of their expenses in determining assessable income.

The allowance is expected to extend to leased equipment and will be passed on to the lessee, *Computer Weekly* said.

While IBM and NCR expect the government action to boost DP sales in the first half of the year, International Computers, Ltd. (ICL) and Honeywell do not predict any great change in the near future.

"It will probably be a little while before companies develop more confidence in the economy," according to Neil Lamming, ICL managing director.

Manufacturers of small systems, on the other hand, are more positive.

"We have already seen a number of cases where the allowance is having a positive effect," Max Burnett of Digital Equipment Corp. said. "There is no doubt the announcement of the investment allowance is being reflected in the business we are doing with many customers."

Confirming this view was Dieter Retz, electronic products sales manager for Gollin Data Systems, who noted that "once we point out the effects of the new investment allowance and the double depreciation allowance to prospects, it swings them in favor of ordering."

U.S. Electronics Makers Reducing Consumption of Foriegn Assembly

HOLLYWOOD, Fla. – U.S. manufacturers of electronics equipment and components are not making use of foreign assembly as much today as they have in the past, members of the International Association of Machinists were told at a recent meeting here.

Dr. John Salzer, senior vice-president of Darling, Paterson and Salzer, cited figures for typical electronics equipment which show offshore production is lower in most cases.

In discrete semiconductors, for example, offshore production as a percentage of domestic production seems to have peaked at 19.5% in 1972 and has been 2% to 4% less since that year, the management consultant said.

"The U.S. recession has played some role in reducing offshore production, since total consumption has been lower," Salzer said. "But other factors are perhaps even more important in terms of long-range trends."

These factors include devaluation of the dollar; rates of inflation worldwide which are higher than in the U.S.; freight costs; trends in U.S. customs policies; lessening tax advantages offered by producing countries; and the difficulty of controlling the quality of offshore production.

Foreign Orders & Installations

Cepsa, a Spanish oil company, has ordered a Univac 1106 system for its Madrid headquarters. Applications will include inventory control, statistics, invoicing, refinery simulations, payroll and general accounting.

Confezioni SanRemo, an Italian men's clothing manufacturer, has ordered two automation systems from Hughes Aircraft Co., including a Hughes AM-1 to grade patterns and create markers and a Lasercutter, which uses a computer-controlled laser beam to cut cloth into patterns.

Canadian Linen Supply Co. has installed a CS 200 Data Communication System from Decision Data Computer Corp. in its London branch, linking it to duplicate equipment in its Toronto office.

The Government of New Zealand has ordered two Decsystem-1060s from Digital Equipment Corp. for a national network to be used by the New Zealand Department of Health.

Tokyo Mitsubishi Fuso Motor Co. Ltd. has ordered a Univac 90/60 from Nippon Univac Kaisha, the Japanese marketing organization of Sperry Rand Corp.

DeHavilland Aircraft of Canada has ordered a computer-controlled loading and fatigue testing system from the Data Systems Division of Datum, Inc. to be used on Dash-7 aircraft.

Aargauische Hypotheken & Handelsbank, a Swiss bank, has ordered a bank terminal system from Bunker Ramo that will consist of Bunker Ramo 2001 universal teller terminals and the BCS-90 modular bank terminal system. Branch banks will be connected to a Univac 90/70 over 4,800 bit/sec leased lines.

Kloten International in Switzerland has installed NCR 255 checkout terminals and an NCR 726 minicomputer in Swissair's duty-free shops.

The World Meteorological Organization, a United Nations agency, has ordered two Control Data Corp. System 17 message-switching computers to be installed in Cairo, Egypt as additional links in its global weather forecasting network.

Recovery Predicted For European Marts

LUTON, England – After two years of slow growth, the major European electronics markets are expected to expand in 1976, although 1973 output levels are unlikely to be matched until 1977, according to the *Yearbook of West European Electronics Data*.

The yearbook is published by Mackintosh Publications, Ltd. and is available for $90 from Yearbook Sales Department, 2680 Bayshore Frontage Road, Mountain View, Calif. 94040.

Busy Schedule for Exhibitors

WASHINGTON, D.C. – The U.S. Department of Commerce has drafted a busy schedule of exhibits for firms in the DP and communications areas. The exhibits all carry Bicentennial themes.

In Sydney, Australia, the exhibit April 5-9 will feature telecommunication systems and equipment.

Stockholm, Sweden (May 4-6) and Milan, Italy (May 11-15) will host exhibits on computers and related equipment.

Mexico City will be the site of another exhibit for communications equipment on June 14-18.

In July, electronic components and materials will be featured in an exhibit in Tokyo, Japan, July 5-9, followed by a multiindustry exhibit in Singapore. The date for this show, which features computers and electronics, will be announced, Commerce said.

A show in Taipei, Taiwan, is scheduled in September for process control equipment.

Further information can be obtained from the Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C. 20230.

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South & Southwest: Atlanta (404/634-5127), Dallas (214/638-4080), Houston (713/626-8705), New Orleans (504/523-2576).
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Mr. Howard Leggett
Regional Service Manager
Suite 315
2200 E. Devon Avenue
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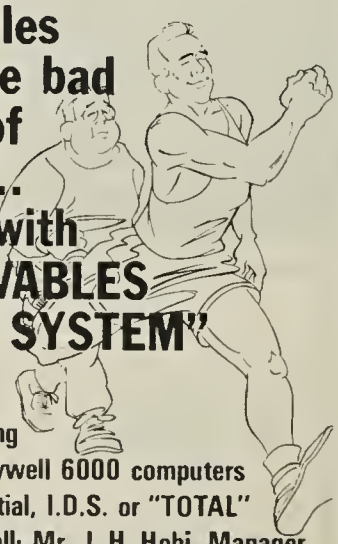

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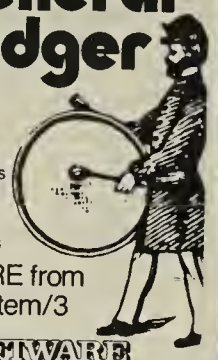

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Special Credits Increase

MAI Scores Record Results in Quarter

NEW YORK – With help from a sizable increase in special credits, Management Assistance, Inc. (MAI) scored record earnings and revenues for the first quarter ended Dec. 31.

The record results were attributed largely to increases in domestic and foreign sales of its Basic/Four small business system. Revenues rose 24% and earnings 50% compared with the year-ago figures.

For the quarter, earnings totaled nearly $3 million or 10 cents a share, including a $1.5 million special credit, compared with a restated $2 million or 7 cents a share in the same period last year when there was a $493,000 tax credit.

Because of a change in accounting for translation of foreign currency transactions, the 1975 first-quarter earnings were increased by $450,000. The net effect of the accounting change for the entire year was a $200,000 increase.

Revenues rose to $28.4 million compared with $22.9 million in the same period last year. Sales of Basic/Four systems rose 40% to $14.3 million and $10.2 million, respectively.

Service fees from Sorbus, Inc., rose 23% to $8.5 million compared with $6.9 million in the year-ago quarter.

The order backlog for Basic/Four systems nearly doubled to $19.3 million compared with $10.6 million in the 1974 period. Sales of the systems accounted for 50% of total MAI revenues for the first period, according to Raymond P. Kurshan, MAI chairman.

In addition, MAI's Genesis One subsidiary acquired Texas Scientific Corp. and has continued to market the G77 CRT terminal and G-Series printer, he said.

Kurshan said he expects earnings and revenues for 1976 will be significantly ahead of those achieved in 1975.

Sycor Continues Upswing in Year, Fourth-Quarter Net and Revenues

ANN ARBOR, Mich. – Sycor, Inc. continued to achieve increased revenues and earnings for the fourth quarter and year ended Dec. 31.

Annual revenues for the intelligent terminal maker totaled $54.8 million compared with $40.1 million in 1974.

Sales rose to $33.1 million compared with $26.1 million last year; rentals and services increased to $54.8 million compared with $40.1 million.

Earnings rose to $6.4 million or $2.25 a share including a $1.3 million tax credit, compared with $5.1 million or $1.82 a share last year, when there was a $1.8 million tax credit.

During the fourth quarter, earnings rose to nearly $2 million or 68 cents a share, including a $313,000 tax credit, compared with $1.4 million or 49 cents a share including a $375,000 tax credit in the year-ago period.

Revenues for the fourth quarter reached $15.2 million compared with $10.7 million in the same period last year.

Sales rose to $8.9 million from nearly $6.5 million while rentals and services increased to $6.3 million from $4.2 million in the fourth quarter last year.

Telex Quarter Profitable Again

TULSA, Okla. – Telex Corp. completed its seventh consecutive profitable quarter in the period ended Dec. 31.

For the third quarter, the firm earned $1.1 million or 10 cents a share, including a $600,000 tax credit, compared with $365,000 or 3 cents a share in the same period last year.

Revenues rose to $25.2 million compared with $24.5 million in the year-ago quarter.

For the nine months, Telex earned $4.7 million or 44 cents a share, including a $1.8 million tax credit, compared with the year-ago figure of $751,000 or 7 cents a share.

Revenues were lower, $77.7 million compared with $81.3 million in the same period last year.

Debt reduction of nearly $6.4 million was achieved during the third quarter, the firm said.

Itel Year Sets Record

SAN FRANCISCO – Itel Corp. realized record earnings and revenues for the year ended Dec. 31.

The leasing firm's earnings rose to $10.7 million or $1.25 a share compared with $9.7 million or $1.07 a share last year.

Revenues rose to $204 million compared with $143.5 million.

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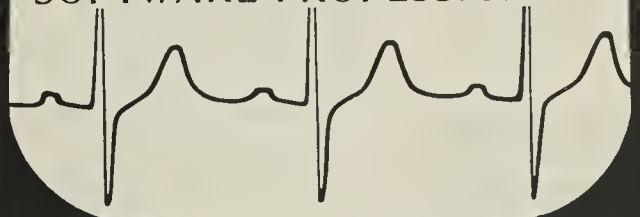

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Earnings Reports

INTEL
Year Ended Dec. 31

	1975	1974
Shr Ernd	$2.35	$2.96
Revenue	136,788,000	134,456,000
Earnings	16,274,000	19,776,000
3 Mo Shr	.66	.44
Revenue	40,253,000	31,284,000
Earnings	4,599,000	2,997,000

NATIONAL DATA
Three Months Ended Nov. 30

	1975	1974
Shr Ernd	$.06	$.10
Revenue	8,283,000	7,683,000
Earnings	282,000	534,000
6 Mo Shr	.15	.18
Revenue	16,591,000	15,278,000
Earnings	767,000	954,000

ANALOG DEVICES
Year Ended Nov. 1

	1975	a1974
Shr Ernd	$.94	b$1.10
Revenue	30,034,190	30,549,434
3 Mo Shr	.27	b.25
Revenue	7,740,472	8,299,618
Earnings	395,844	354,235

a-Restated for accounting changes of foreign currency translation. b-Adjusted for a 5% stock dividend in March 1975.

GENERAL INSTRUMENT
Three Months Ended Nov. 30

	1975	1974
Shr Ernd	$.25	a$.56
Revenue	103,508,122	106,397,663
Earnings	2,164,231	4,410,333
9 Mo Shr	.49	a1.52
Revenue	288,913,149	332,956,336
Earnings	4,664,053	12,018,356

a-Adjusted for a 2% stock dividend in May 1975.

NATIONAL CSS
Three Months Ended Nov. 30

	1975	a1974
Shr Ernd	$.50	$.38
Revenue	9,032,380	8,043,539
Earnings	548,200	420,100
9 Mo Shr	1.41	1.26
Revenue	26,289,480	24,704,634
Earnings	1,541,200	1,382,000

a-Restated.

COMPUTER MACHINERY
Three Months Ended Sept. 30

	1975	1974
Revenue	$16,630,000	$12,743,000
aSpec Chg	40,000	367,000
Loss	2,161,000	2,146,000
9 Mo Rev	46,682,000	41,952,000
Tax Cred	100,000	109,000
Loss	2,963,000	373,000

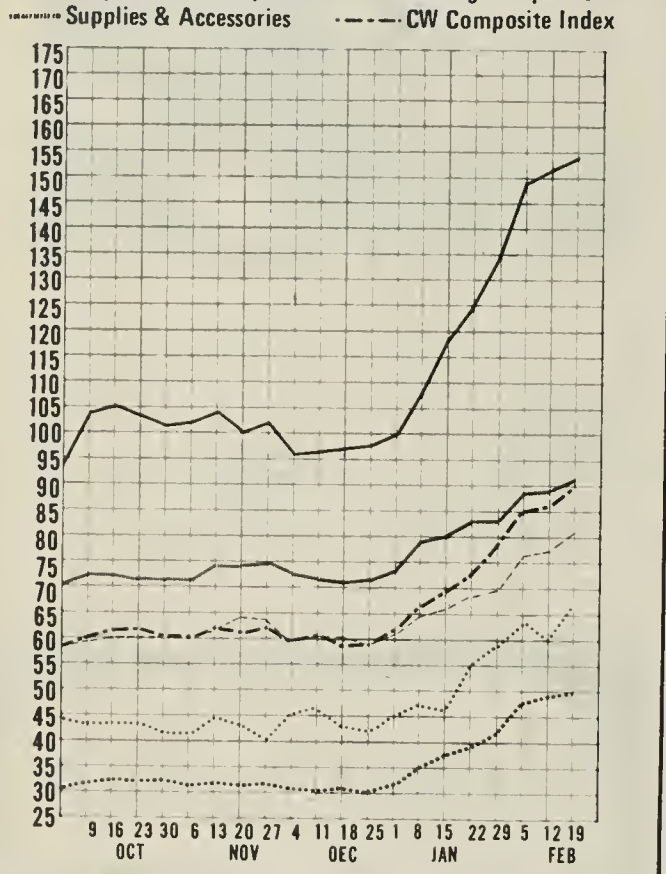
a-Reversal of tax-loss carryforward.

NUCLEAR DATA
Three Months Ended Nov. 30

	1975	a1974
Shr Ernd	$.21	.....
Revenue	3,872,721	$4,428,745
Spec Item	d97,000	b(16,000)
Earnings	179,029	(70,356)
9 Mo Shr	.47	.45
Revenue	11,090,872	15,055,768
Tax Cred	220,000	170,000
Earnings	e408,221	409,972

a-Includes results of nuclear medicine product line sold in January 1975. b-Reduction of tax-loss carryforward credit. d-Tax-loss carryforward credit. e-Includes $38,000 gain on sale of facilities in Cork, Ireland.

COMPUTERWORLD Computer Stocks Trading Indexes



Computerworld Sales Offices

National Sales Manager
Roy Einreinhofer
Advertising Administrator
Judy Milford
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
1541 Westwood Boulevard
Los Angeles, Calif. 90024
(213) 477-3535

Japan:
Mr. T. Kasuya
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 18, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1975-76 RANGE (1)	CLOSE FEB 18 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	103 1/4	+1 1/8	+1.1
O	COMPUTER AUTOMATION	2- 17	14 3/4	- 1/8	-0.8
N	CONTROL DATA CORP	11- 26	25 1/4	- 3/4	-2.8
N	DATA GENERAL CORP	10- 49	47 1/8	- 1/8	-0.2
O	DATAPOINT CORP	6- 36	36	+3 3/4	+11.6
O	DIGITAL COMP CONTROL	1- 4	3 3/4	0	0.0
N	DIGITAL EQUIPMENT	46-166	158	-4 7/8	-2.9
N	ELECTRONIC ASSOC.	2- 5	4 3/4	+ 1/8	+2.7
A	ELECTRONIC ENGINEER.	5- 12	11 3/4	+1 3/4	+17.5
N	FOXBORO	23- 42	36 1/2	- 7/8	-2.3
D	GENERAL AUTOMATION	4- 14	8 3/4	- 1/4	-2.7
O	GRI COMPUTER CORP	1- 1	1	0	0.0
N	HEWLETT-PACKARD CO	58-120	109 3/4	-1 3/4	-1.5
N	HONEYWELL INC	22- 54	52 1/2	-1	-1.8
N	IBM	158-264	255 3/4	+ 1/2	+0.1
D	MANAGEMENT ASSIST	1- 1	1 3/8	0	0.0
O	MEMOREX	1- 15	14 3/4	+ 1/2	+3.5
O	MICRODATA CORP	2- 20	19 5/8	0	0.0
O	MODULAR COMPUTER SYS	5- 19	11 1/4	- 1/4	-2.1
N	NCR	15- 39	29 1/2	+ 1/4	+0.8
D	PRIME COMPUTER INC	2- 7	7	+1 1/2	+27.2
N	PERKIN-ELMER	16- 30	25 1/8	-1 5/8	-6.0
N	RAYTHEON CO	26- 59	48 3/4	-2 1/2	-4.8
N	SPERRY RAND	26- 49	46	- 1/2	-1.0
O	SYCOR INC	5- 29	28 3/4	+5 1/4	+22.3
A	SYSTEMS ENG. LABS	1- 9	7 1/8	-1	-12.3
N	VARIAN ASSOCIATES	7- 18	16 3/4	- 1/8	-0.7
N	WANG LABS.	7- 19	19	+1 7/8	+10.9
	LEASING COMPANIES				
O	COMDISCO INC	1- 7	6 3/4	+ 1/2	+8.0
A	COMMERCE GROUP CORP	2- 4	2 7/8	+ 1/8	+4.5
A	COMPUTER INVSTRS GRP	1- 2	1 3/8	+ 1/8	+10.0
M	DATRONIC RENTAL	1- 1	3/8	0	0.0
A	DCL INC	0- 1	1/2	+ 1/8	+28.5
N	DPF INC	3- 7	6 1/8	- 1/8	-2.0
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 4	4	+ 1/8	+3.2
N	ITEL	3- 10	9 3/4	+1 3/4	+21.8
N	LEASCO CORP	4- 14	12 3/4	+2	+18.6
O	LEASPAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	0- 4	1/4	+ 1/8	+100.0
A	PIONEER TEX CORP	2- 8	8 1/8	+ 7/8	+12.0
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	11 1/4	+1 1/4	+12.5
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 1	7/8	0	0.0
A	APPLIED DATA RES.	1- 10	2 1/2	+ 1/8	+5.2
N	AUTOMATIC DATA PROC	29- 65	61	-3	-4.6
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	COLEMAN AMERICAN COS	4- 6	5	0	0.0
O	COMPUTER DIMENSIONS	2- 6	6	+ 3/4	+14.2
D	COMP ELECTION SYSTMS	3- 7	5 1/4	- 1/4	-4.5
O	COMPUTER HORIZONS	1- 1	1/2	0	0.0
O	COMPUTER NETWORK	1- 4	3 7/8	+ 3/8	+10.7
N	COMPUTER SCIENCES	2- 6	6 3/8	+1	+18.6
O	COMPUTER TASK GROUP	1- 1	7/8	0	0.0
O	COMPUTER USAGE	2- 4	3 1/8	- 1/8	-3.8
D	COMSHARE	2- 4	2 1/2	- 1/4	-9.0
O	COMTEN INC	1- 8	7 3/8	+ 7/8	+13.4
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	15 7/8	- 1/8	-0.7
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	7/8	+ 1/8	+16.6
O	KEANE ASSOCIATES	2- 3	3 3/4	+ 7/8	+30.4
O	KEYDATA CORP	2- 4	3 1/4	0	0.0
O	LOGICON	3- 5	4 1/8	+ 1/8	+3.1
A	MANAGEMENT DATA	1- 3	2 1/8	+ 1/4	+13.3
A	NATIONAL CSS INC	6- 22	22 3/8	+2	+9.8
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 19	20 5/8	+1 1/4	+6.4
N	PLANNING RESEARCH	2- 6	4 1/2	+ 1/2	+12.5
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	4 7/8	+1 1/8	+30.0
D	REYNOLDS & REYNOLD	10- 24	20	+2	+11.1
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1	0	0.0
O	TYMSHARE INC	7- 27	27 1/4	+1 1/4	+4.8
A	URS SYSTEMS	2- 4	3 1/2	+ 1/8	+3.7
N	WYLY CORP	2- 5	4	+ 1/8	+3.2
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 13	13	+1 1/4	+10.6
O	ADVANCED MEMORY SYS	1- 8	8 1/4	+ 1/2	+6.4
O	AMPEX CORP	3- 8	8 1/8	+ 3/4	+10.1
O	ANDERSON JACOBSON	1- 3	2 3/4	+ 3/8	+15.7
O	BEEHIVE MEDICAL ELEC	1- 5	4 3/4	+ 1/2	+11.7
A	BOLT,BERANEK & NEW	5- 13	7	- 3/4	-9.6
N	BUNKER-RAMO	4- 8	6 1/2	+ 3/8	+6.1
A	CALCOMP	3- 7	5 1/2	- 1/8	-2.2
O	CAMBRIDGE MEMORIES	1- 5	2 3/4	- 3/8	-12.0
N	CENTRONICS DATA COMP	7- 35	28 7/8	-5 5/8	-16.3
O	CODEX CORP	15- 38	27	+ 1/2	+1.8
O	COGNITRONICS	1- 2	7/8	+ 1/8	+16.6
O	COMPUTER COMMUN.	1- 2	2 7/8	+ 3/8	+15.0
O	COMPUTER CONSOLES	3- 7	5 1/4	+ 1/4	+5.0
A	COMPUTER EQUIPMENT	1- 2	1 7/8	- 1/8	-6.2
D	COMPUTER MACHINERY	1- 2	1 7/8	0	0.0
D	COMPUTER TRANSCEIVER	1- 2	1	0	0.0
O	COMTEN	2- 8	7 3/8	+ 7/8	+13.4
N	CONRAC CORP	12- 30	23 1/4	- 1/4	-1.0
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
D	DATA 100	5- 16	9	+ 7/8	+10.7
A	DATA PRODUCTS CORP	2- 10	9 3/4	+1 3/4	+21.8
O	DATA TECHNOLOGY	1- 3	1 7/8	0	0.0
O	DATUM INC	1- 2	1 1/8	0	0.0
D	DECISION DATA COMPUT	2- 7	3 1/8	- 1/4	-7.4
D	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIAN CONTROLS	1- 1	1/2	0	0.0
N	ELECTRONIC M & M	1- 3	3	+1	+50.0
O	FABRI-TEK	1- 1	1	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 3/4	- 1/4	-12.5
N	HAZELTINE CORP	3- 10	9 1/2	+1 1/8	+13.4
N	HARRIS CORP	18- 41	39 5/8	-1 1/8	-2.7
A	INCOTERM CORP	3- 16	15 5/8	+1 1/4	+8.6
D	INFOREX INC	2- 5	4 3/4	+ 5/8	+15.1
O	INFORMATION INTL INC	8- 16	15 5/8	- 1/4	-1.5
O	INTEL CORP	21- 95	91 1/2	-3 1/2	-3.6
A	LUNDY ELECTRONICS	3- 7	6 1/2	0	0.0
O	MSI DATA CORP	3- 10	4 1/2	0	0.0
A	MILGO ELECTRONICS	8- 24	17 7/8	0	0.0
N	MOHAWK DATA SCI	1- 6	5 1/8	- 5/8	-10.8
O	OPTICAL SCANNING	1- 3	1 3/8	0	0.0
D	PENRIL CORP	1- 2	1 1/4	0	0.0
A	RERTEC CORP	2- 8	6 5/8	0	0.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INSI.	1- 1	1 1/2	0	0.0
O	QUANTOR CORP	2- 6	5 1/8	0	0.0
O	RECOGNITION EQUIP	2- 9	8 3/4	+ 3/4	+9.3
N	SANDERS ASSOCIATES	3- 11	9 3/4	+ 3/4	+8.3
D	SCAN DATA	1- 3	2 1/8	- 1/4	-10.5
O	STORAGE TECHNOLOGY	6- 17	11 1/2	+1 7/8	+19.4
D	T BAR INC	3- 7	7 3/8	+ 3/8	+5.3
D	TALLY CORP.	1- 6	5	0	0.0
D	TEC INC	1- 4	3 1/2	+ 1/4	+7.6
N	TEKTRONIX INC	18- 59	59	+1 3/4	+3.0
N	TELEX	1- 4	3 5/8	0	0.0
O	WANGCO INC	4- 15	15	0	0.0
D	WILTEK INC	1- 4	2	0	0.0
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 3	1 3/8	+ 1/8	+10.0
D	BALTIMORE BUS FORMS	4- 5	5	+ 1/4	+5.2
A	BARRY WRIGHT	5- 8	7 7/8	0	0.0
D	CYBERNATICS INC	0- 1	1/4	- 1/8	-33.3
A	DATA DOCUMENTS	29- 42	40 1/4	+ 1/2	+1.2
O	DUPLEX PRODUCTS INC	12- 25	23	+ 5/8	+2.7
N	ENNIS BUS. FORMS	5- 8	7 5/8	+ 5/8	+8.9
O	GRAHAM MAGNETICS	5- 12	11 1/2	+1	+9.5
O	GRAPHIC CONTROLS	8- 21	16 1/4	0	0.0
N	3M COMPANY	43- 68	58 3/8	-1 3/4	-2.9
D	MOORE CORP LTD	39- 51	46 1/2	-2	-4.1
N	NASHUA CORP	9- 22	15 3/4	+3 1/8	+24.7
O	STANDARD REGISTER	11- 20	17 1/4	-1 1/4	-6.7
D	TAB PRODUCTS CO	4- 8	6 1/2	- 1/4	-3.7
N	UARCO	17- 24	23 5/8	+ 3/4	+3.2
O	VANDER GRAPHICS CORP	4- 7	5	0	0.0
A	WABASH MAGNETICS	3- 7	6 5/8	+ 7/8	+15.2
N	WALLACE BUS FORMS	15- 25	23 3/4	+ 7/8	+3.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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